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INDIA'S PEOPLES AND THEIR FOOD

Sir E. John Russell, F.R.S.*

THE Union of India—Bharat—had at March, 1951, a population of 356·83 millions,[1] an increase of some 40 million over the 1941 Census. This represents a gain of about 13 per cent., or eight per minute day after day, month after month, and year after year. During the decade 1931–1941 the increase had been 15% for the whole sub-continent and for the still earlier decade 1921–31 10%, but in the period 1911–21 there had been no significant increase. The steady rise in the rate of increase largely results from the work of the British agricultural and medical staffs in mitigating the effects of the diseases and periodical famines that used to keep down numbers. Nearly 83 per cent. of the population live in rural areas and 70 per cent. of them depend on agriculture for a livelihood.

Soil and Water Resources

The gross land area is 1·14 million square miles or 729 million acres. Of this, however, only 528·3 million acres are classified : this part is commonly called the net area and the statistics have reference to it alone. The utilisation in 1950 was as follows :—

Union of India, million acres.

Gross	Classified	Cultivable	Land area sown	Irrigated	Cultivable but not sown
781·5	536·3	369·7	235·8	49·3	133·9
†729	528·3	366·3	233·6	48·5	132·7

(Report of the Planning Commission, New Delhi, 1950).
†Omitting Kashmir and Jammu.

The area " cultivable but not sown " includes about 64 million acres of fallow and the area not cultivable includes some 54 million acres of forest. The average density of population is 296 per sq. mile : the area of sown land per head of population is 0·60 acres. There is some double sowing and the area of crops is 278 million acres, but 42 million acres are in non-food crops. The actual area of food crops is, like the sown land area, 236 million acres. This area, however, is constantly diminishing : in 1911 it had been 0·9 acres per head : since that date the area of cultivated land has somewhat increased, but not enough to keep pace with the growth of population. Meanwhile, large areas of land are lost annually by erosion, waterlogging and other causes discussed later. There is no evidence that yields per acre have increased.

The sown land is very unevenly distributed : 80% of it is included in eight states, which between them comprise only 58% of the gross area. The statistics for these states are given in Table 1.

* An address delivered to the Annual Conference of the Association in London on January 3rd, 1952.

[1] This does not include 4·37m. (estimated) in Kashmir and Jammu which are still subject of dispute with Pakistan.

TABLE 1.

Land utilisation of the chief food-producing states of the Union of India : million acres, 1950.

State	Sown area.	Cultivable area.	Sown as % of Cultivable.	Irrigated area.	Irrigated as % of sown.
Attar Pradesh*	38·1	50·8	75	12·6	33
Madras	31·6	52·1	61	9·9	31
Bombay	28·2	34·7	81	1·4	5
Madhya Pradesh† ..	24·2	42·4	57	1·7	7
Bihar	17·6	31·3	56	5·3	30
E. Punjab	11·9	16·1	74	6·0	51
W. Bengal	11·2	14·1	80	1·8	16
Orissa	6·5	11·0	59	1·3	21
Assam	5·2	24·1	22	1·0	21
Total " A " States ..	174·7	276·7	63	41·2	22
Hyderabad	22·5	38·5	58	1·4	6
Mysore	6·2	10·3	60	1·1	18
Union of India	235·8	369·7	64	49·3	21

* Formerly United Provinces.

† Formerly Central Province and Berar.

As often happens in hot countries the soils are poor by British standards, their content of organic matter and plant food, especially nitrogen and phosphate, being much lower than is usual in English soils : the nitrogen content is often only about 0·05% or less as compared with 0·12 to 0·16% or more in England. This poverty arises partly from the rapid destruction of the soil organic matter by termites and other insects and by micro-organisms under the influence of the prevailing high temperature but largely from the inability of the peasants to grow such restorative crops as clover, lucerne, or grasses, owing to the overriding necessity to produce cereals. This low level of plant nutrients results in low levels of productiveness, except where it can be overcome by the use of nitrogen and phosphatic fertilisers or organic manure. In all these materials India's resources are low.

Over most of India water supply is the chief factor limiting crop production : water is more precious than land and is, indeed, in some districts a potent motive for crime. The peasants have learned by long experience much more about conserving water than about conserving soil.

Water for crops comes from three sources :

(1) The rainfall, everywhere markedly seasonal ;

(2) The northern rivers fed by the rains and melting snows of the Himalayas ;

(3) Supplies in the subsoil.

The Rainfall and its Utilisation

Of all India's water resources the monsoon is by far the most important : a good monsoon may mean plenty and a bad one hunger or even famine. 80% of India's cropped land is entirely dependent on it and over a large part of the country it is unreliable. It is traditionally

reckoned that the monsoon fails in one year in five, but forecasting is not yet possible in spite of much good work by Gilbert Walker and others. Fortunately the failure is frequently only local ; hungry areas may be supplied from those more fortunate, but this has become more difficult since partition.

The rainfall is highest in the north-eastern regions, especially in parts of Bengal and Assam, where it reaches 200 or more inches a year ; the Assam hills hold the world's record for measured rainfall—905 inches in the year 1861 : of this 366 inches fell in July. Throughout these north-eastern regions floods are liable to occur, often doing great damage.

Going westwards along the northern plain the rainfall rapidly decreases till in Sind it is only 5 inches a year and in Baluchistan, Rajput and Makran there are great deserts. But much of this plain is so well watered by the rivers rising in the Himalayas and it has such stores of subsoil water that irrigation can take the place of rain. Going south through the plateau region of the peninsula the rainfall also decreases, but not so much as in the north : in the eastern part it may be 30 inches or more ; in the west it is less. In the south the delectable state of Mysore and the happy land of Travancore have fairly good rainfall and 29% of Travancore's sown land is irrigated.

The central section, the northern part of the plateau which stretches southwards from the Vindhya ranges, is the region most dependent on rainfall as its rivers are not well suited to irrigation, and, unlike the northern plains, it has no great stores of subsoil water. It includes Madhya Pradesh (the old Central Provinces), the Bombay Presidency, Hyderabad, Madhya Bharat (Gwalior) and Bhopal : only 1 to 7% of their sown areas is irrigated. The eastern part of Madhya Pradesh is fairly well off, having a rainfall of 50 to 70 inches : this is ample even for paddy, its chief crop ; the north-western section has less, 45–55 inches, sufficient for wheat and gram ; but the south-eastern section has still less, only about 30 to 35 inches, and here cotton and millet are the chief crops. The Bombay Presidency is worse off. A belt about 100 to 150 miles wide on the eastern side of the Western Ghats is especially liable to droughts. Most of the summer monsoon—which comes from the Arabian Sea—is intercepted by the mountains ; some rainfall comes with the so-called winter monsoon from the Bay of Bengal, but it comes erratically and in storms : the annual rainfall has ranged from 14 to 48 inches, the average being about 20 to 25 inches, but 4 inches may fall in one hour. About half the year's rain may come in September and October and all of it between July and November. Crop production is hazardous : a state of emergency or even of famine has periodically had to be proclaimed. Here India's poverty and malnutrition are seen in all their nakedness.

Dry Farming Methods

The Department of Agriculture early began to work out methods for the more effective utilisation of the rainfall here, and gradually the

so-called Bombay Dry Farming System has been developed which has proved very effective. It consists of three parts. The cropping programme is carefully adapted to the local conditions. Soils 18 inches or more in depth are used for winter (rabi) crops ; shallow soils less than 9 inches in depth are used for summer (kharif) pulses or for grass if the slope is great ; soils of intermediate depth can be used for most kharif crops. Crop varieties are selected or bred to be drought resistant and early maturing. Various cultural and soil management devices are adopted.[2] Shallow banks or bunds are put round the fields to impound rain water and restrain the run off. Ploughing, if done, is shallow,[3] but neither at the Sholapur nor the Bijapur experimental farms has ploughing been necessary at all ; harrowing has served just as well. Local experiments are always needed to determine what cultivation should be done, when and how often : the purposes are to build up a good crumb structure in the soil, to obtain a favourable seed bed and to destroy weeds, but the surface of the soil must be left rough to avoid wind erosion and to facilitate the sinking in of the rain water. Proper rotations must be worked out ; optimum times and rates of seeding, spacing and depth all need to be determined by trial as do the possibilities of manuring, especially with farmyard manure. It is estimated that these special dry farming methods are needed on some 15 million acres of land in the Bombay Presidency, as well as considerable areas in other states. Even at best they are liable to break down in a year of poor rainfall.

Irrigation

Properly conducted irrigation is the surest means of crop production and it has been practised from very ancient times in India. References occur in the Rigveda period (c.2500 B.C.) to irrigation from canals, wells and lakes, and to the skilled craftsmen who " rendered the fields fertile ; they led forth the rivers ; plants spring upon the waste and water spreads over the low places."[4]

Canals, wells and tanks remain to this day India's sources of irrigation water. Modern developments began in 1865 when the Government of India introduced a system of public loans for financing irrigation works. The British engineers and agriculturalists, however, transformed the ancient art into a modern science, and when they departed from India in 1945 they left behind them some of the greatest and most efficient irrigation schemes in the world. The men who did the work had but scanty recognition, and the myriads of people who will benefit by them will never know to whom they owe them. During the present century the irrigated area in the pre-partition provinces

[2] These methods are discussed by J. K. Basu : 38th Indian Soil Congress Bangalore, 1951.

[3] The older recommendation of deep ploughing and fine surface mulch has been given up.

[4] H. H. Wilson, *Rig Veda Sanhita*, Bangalore. See also Radha Kumud Mookerji, *Hindu Civilisation*, London, 1936, and A. K. Narayan Ayer, *Agriculture and Allied Arts in Vedic India*, Bangalore, 1949.

increased from 30 million acres in 1900 to over 70 million acres in 1947, the largest in the world. Asia has, indeed, 70% of the world's irrigated land, most of it watered from the Himalayan rivers. The Indian areas are watered as follows :—

Canals	Wells	Tanks	Other areas[5]	Total Million acres
20·9	12·6	9·3	6·5	49·3

Government works are responsible for 85% of the canal-irrigated area and about 35% of the rest.

Wells are the simplest and most widely used source of irrigation water though they serve only about a quarter of the irrigated land. The water is lifted either by man power using a long pole as lever to pull the buckets out of the well, or by a windlass or Persian wheel worked by oxen : the creaking of the wheels is one of the most typical sounds of the Indian countryside. Wells have the usual advantage that each peasant has his own and can take the water when he wants ; further, the appliances are simple and can be made and kept in repair by the village craftsmen, but they are very inefficient : a pole pump waters only about four acres and a water wheel only about five to twelve acres. A much better appliance, the tube well, was introduced by Sir William Stampe in 1934 into the United Provinces from California, and has proved so successful that by 1937 some 1,700 had been sunk to irrigate about 750,000 acres of crops, an average of about 440 acres each. The average depth of the well is 270 feet, and this taps some 80 feet of coarse waterladen sands : the water is under pressure and rises to 40 to 50 feet from the surface whence it is pumped up to the irrigation channels. It can be made to serve several purposes. The issuing stream of water can be tapped by the women for filling their pots for domestic use ; it flows into a tank where they can do their washing, and thence to a large tank where the men can bathe. A well yields about 30,000 gallons of water an hour and the pumping is done by electric power generated from the Ganges Canal Hydro-electric Grid System.

The area commanded by the well is about double the area watered at any one time : it averages about 1,000 acres (roughly 1½ square miles) and about 500 acres of crops are irrigated.[6] The demand is so great that by 1950 the United Provinces had some 7,000 in operation, about one-third of which were Government-owned, while they were also widely used in the Punjab, Bihar and elsewhere. A British engineering firm is sinking another 1,000 in the Ganges valley.

By 1948 more than 3,000 cusecs were being pumped in the Indo-Gangetic plain and there was no evidence of any fall in the water level. Stampe considers that it is maintained by an underground river which he equates with the Saraswati of Hindu mythology, and of which only the upper level has as yet been tapped ; 60 to 80 million gallons per square mile per hour could, he thinks, be safely pumped. If this be so a

[5] Includes flood irrigation from rivers and some private tanks.
[6] Sir William Stampe, *Empire J. Expt. Agric.*, 1948, vol. 16, pp. 47–54.

considerable increase is possible in the number of tube wells along its course.

In other districts, however, extension of pumping systems seems to have lowered the water table. In the Madras Presidency, I was informed that it is 12 feet lower in some places than it was before the war ; it had fallen in the Central Provinces also. A survey of underground water supplies is urgently needed, and the present freedom to sink wells of any depth in any place may have to be curtailed.

Efficient and economic use of the water requires a minimum length of channels and distributaries : this necessitates a rectangular layout of the crops. The peasant holdings on the other hand are commonly irregular in outline : the peasants are often unwilling to correct this by exchange of land. But they are prepared to consolidate their crops into the necessary rectangles in order to get the benefit of the tube well, and they accept further the need for uniformity of variety, cultivation and manuring so as to secure uniformity of growth. This, of course, is in marked contrast with the ordinary peasant holding, each with its little well and its crops grown in separate and independent patches. Tube well areas stand out as vivid green rectangles against the parched brown appearance of the surrounding countryside, and the villages often have a refreshing look of prosperity. The peasant fully recognises the value of a tube well.

Irrigation from Rivers by Canals

One of India's tragedies is the irregular flow of its rivers. They are in full spate during the monsoon period, and those rising in the Himalayas receive in July and later vast additional quantities of water from the melting snow and ice in the mountains. They tear along, laden with silt, often overflowing their banks and doing much damage to crops, in places eroding the soil or covering it up with sand or silt, at times, as in Bengal in 1943, destroying whole villages with much loss of life. Then when the monsoon ends the rivers shrink ; the dry season sets in and the fear is not of flood but of drought.

Hitherto it has not been found practicable to store much of the seasonal spate of water but only to divert some of it on to the land for useful crop production. Barrages or diversion weirs have been constructed to deflect some of the water into one or two main canals out of which a network of distributaries carries it on to the fields. The river banks are raised by levees for some distance above the barrage and this leads to some storage of water, but the system ceases to function when the river level falls too low ; the soil, however, may still be moist enough to carry a further crop. There are several of these diversion dams in the north and on the eastern coast and probably there is little scope for many more.

The proportion of river water used, however, is very small : about 1,356 million acre-feet of water are estimated to flow annually through the rivers of India, but under 6% (only about 76 millions) are taken for

irrigation.[7] The utmost that can at present be hoped for the remaining 94% is that it may flow harmlessly to the sea.

In addition to the canal systems fed by rivers there are many tanks and reservoirs to store the rain water for use on the land.

The Food and Cash Crops

Food crops amount to 236 million acres and cash crops to 20 million. (Table 2). The total is greater than the sown area of land because some of it carries two crops a year.

TABLE 2.

Areas and yields of principal crops, Union of India, 1949–50.

I. Food Crops.

	Million acres.	Million tons.	Million acres.	Million tons.
Cereals.				
Kharif crops :				
Rice	73·9	22·8	160·8	37·0
Maize	8·7	2·3		
Millets :				
Jowar	37·7	5·8		
Bajra	21·3	2·6		
Ragi	5·4	1·4		
Small millets	13·8	2·2		
Rabi crops :				
Wheat	24·1	6·3	31·8	8·5
Barley	7·6	2·2		
Total Cereals			192·6	45·5
Other Food Crops.				
Gram	20·2	3·7		
Other pulses	26·0	4·0		
Oil seeds (edible)	19·0	4·6*		
Potatoes	0·55	1·5		
Sugar Cane	3·6	4·9		
Total Food Crops			235·9†	64·1

II. Cash Crops.

	Million acres	Output Millions
Cotton	11·8	—
Jute	1·2	3·1 bales of 400 lbs.
Oil seeds (non-edible)	5·1	0·5 tons
Tobacco	0·8	0·2 tons
Tea	0·77	535·0 lb.
Coffee	0·22	38·6 lb.
Rubber	0·16	33·7 lb.
Total Cash Crops	20·05	

* Includes : ground nuts, 9·7 million acres, 3·4 million tons ; rape and mustard, 4·7 million acres, 0·8 million tons ; sesamum, 4·6 million acres, 0·4 million tons. Total, 19 million acres, 4·6 million tons.

† The total area of crops was in 1948/9 provisionally estimated at 278 million acres of which 187 million were cereals. This exceeds the area of land sown (236 million acres) because some of the land (about 44 million acres) carries two or more crops a year.

Note.—A third group of crops supplies neither food nor cash and is therefore not enumerated ; it includes crops for fodder, green manure and other purposes, usually second sowings after a main crop, and a number of miscellaneous crops.

[7] Report of Planning Commission, 1950.

The chief food crops are rice, millet and wheat, with some maize and barley ; these between them occupy 65 to 70% of the sown area. Pulses are next in area, then come the oil seeds, relatively small in area but very important in India's dietary. Fruit—particularly mangoes—and vegetables are grown near the village but to a less extent than they should be. The chief cash crops are jute, cotton and sugar cane, but sugar cane ranks also as a food crop. Tea and coffee are of great importance in the very limited areas where they grow well : they make considerable contributions to the national income. Tea is confined to the acid soils of the wet hill tracts around Darjeeling, in Assam, and southern India ; its cultivation is highly specialised and still largely remains in British hands. Coffee is grown in southern India.

The chief factor determining crop distribution is the water supply. Rice, jute and tea require most water and are therefore found in the regions of high rainfall, or in the case of rice, of adequate irrigation. At the other extreme come the millets and short stapled cotton, which tolerate drier conditions than other crops and are grown in low rainfall regions. In between come wheat, and, often associated with it, gram ; also other pulses and oil seeds, sugar cane and longer stapled cotton : all require good but not excessive supplies of water.

Of all the crops rice is by far the most important : it is India's chief food. As grown it is called paddy : after the husk is removed it becomes rice. Usually 100 parts of paddy give 67 to 70 of rice. As a plant it does not appear to be very adaptable to different conditions, but fortunately vast numbers of varieties, wild and cultivated, occur in India, more than in any other country—some 2,000 in Bihar alone ; one or other can also always be found satisfying the local conditions of soil and climate and the rather fastidious demands of the local markets. Some varieties are almost as tolerant of dry conditions as barley ; others can grow in water, and can keep pace with a steadily rising flood to 10 or 15 feet ; some can grow up to two feet a day in order to keep their heads above water : the straw may finally be 20 feet long. The work of classifying these different varieties, and cross breeding to produce newer ones, was started in 1913 by G. P. Hector in Bengal and by F. R. Parnell at Coimbatore in Madras, and has continued ever since ;[8] it is carried on now in each of the states ; the experimental rice station at Chinsurah, Bengal, is to do international work under the aegis of F.A.O. No experimental work in the whole field of agriculture is more arduous : it involves paddling about in gum-boots in mud and water infested with snakes, leeches and other noisome beasts, with no shade from the broiling sun, in regions infested with malarial mosquitoes and annoying insects of every kind. But the breeders have done good

[8] Hector's publications began in 1913 in *Mem. Dept. Agric. India Bot. Ser.*, vol. 6 ; his work on classification, done with several collaborators, is recorded in *Indian J. Agric. Sci.*, 1934, vol. 4. Parnell's work is described in volumes of the *Mem. Dept. Agric. India Bot. Ser.*, beginning 1919, vol. 9, p. 75 and ending 1922, vol. 11, p. 185. It was developed by N. Ramiah. A summary of Indian investigations on rice and other crops is given by R. H. Richharia, *Plant Breeding and Genetics in India*, Patna, 1945.

work; they have produced earlier maturing varieties that can be removed in time to allow a second crop to be sown in the same year: varieties protected from the destructive insect gundhi by a leaf sheath that encloses the panicle of grains—otherwise open and exposed to attack: also varieties with purple leaves that the cultivator can readily distinguish from the green leaves of the wild rice growing as a weed in the crop and greatly reducing its yield.

Paddy produces more food per acre than any other grain crop in India. Yields of 1,000 to 1,500 lb. per acre (i.e. 670 to 1,000 lb. of rice) are not uncommon. 4,000 lb. or more have been obtained by suitable manuring with oil cakes and sulphate of ammonia, and in India's most prolific region, the Ambasamu Oram district of the Tinevally River, where two crops a year are grown, the record yield is 7,000 lb. per acre for the first and 5,000 lb. per acre for the second, making 12,000 lb. per acre in all. The ordinary cultivator gets nothing like these yields: he has only one crop a year and the average yield for the whole country is about 750 lb. of rice per acre.[9] The rice is boiled and eaten with curry and some vegetable; it is commonly served on a large leaf instead of a plate.

Next to rice, the millets are the most common foods in India. These lack the attractiveness of rice and of wheat: they are the poor relations among the grain crops and the poor man's food, but they have the invaluable property of being able to grow in conditions which neither wheat, rice nor maize could tolerate. They require less water to produce a given weight of dry matter and they can survive droughts that would be fatal to other cereals: they are also more tolerant of the soluble salts that often occur in arid soils. Further, their leaves and stalks provide food for the animals.

Like rice the millets appear to be indigenous to India and large numbers of different sorts occur: some 36 species and more than 200 varieties are known at the Coimbatore Research Station to be in cultivation and there are probably many others. Jowar or Great Millet (*Sorghum vulgare*) is the most popular, followed by Bajra, Pearl or Bullrush Millet (*Pennisetum typhoideum*): these indeed are often grown as kharif or summer crops in the rainy season. Ragi or Finger Millet (*Eleusine coracana*) and Indian Millet (*Setaria italica*) both tolerate poorer conditions, but the poor man's millet *par excellence* is Kodo (*Paspalum scrobiculatum*), most tolerant of all of drought and poverty and grown on poor soil in hilly tracts: these, however, are much less widely cultivated. As the millets are grown in much poorer conditions than rice or wheat, their yields are naturally lower: the average for jowar is put by the Planning Commission at 418 lb. per acre and that of bajra at 345 lb.: the other sorts give still lower yields. So far the plant breeders have been less successful in improving the

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[9] The Planning Commission puts it at 760 lb. for the period 1939–46 and F.A.O. gives the average as 10·5 cwt. paddy per acre: taking 70% as the conversion factor this comes to 735 lb. rice per acre.

millets than they have with wheat and rice : but the peasants have had a long start in making their selections.[10]

Wheat comes between rice and millets in its water requirements and does not tolerate high temperatures ; it is largely confined to the drier parts of the north and even there it is a winter or rabi crop : it is usually grown on good soils and indeed the wheat belt which stretches across the United Provinces and the Punjab includes some of the most productive land in India. The wheat is not made into loaves but into flat cakes, like pancakes, called *chapatties*.

British plant breeders have done much to improve the Indian wheats. The pioneering work of collecting and classifying was done by W. H. Moreland and Bryce Burt : the breeding was started in 1905 at Pusa by A. Howard and his wife, Gabrielle ; some of their sorts still survive. The work has been diligently continued since and is now being carried on by New Delhi under B. P. Pal and elsewhere.[11] The average yields in lb. per acre of these food grains have been for the ten years 1937 to 1946 :—

	Average lb. per acre	Range
Rice	759	678–796
Wheat	615	541–671
Jowar	418	322–479
Bajra	315	273–392

The total production of food grains including rice, the millets, wheat, maize. barley and gram has been as follows for the Union of India :—

	1943/4	1944/5	1945/6	1946/7	1947/8	1948/9	1949/50	Average
Million acres	192	202	198	196	191	207	213	200
Million tons	51·7	51·1	45·7	46·1	48·2	47·8	49·1	48·5

The average over-all yield of grain is 540 lb. per acre, about 0·9 million calories per acre. The average quantity of grain produced per head of population is thus 300 lb.[12] Next in importance to the cereals come the pulses, of which gram (*Cicer arietinum*) is the chief : lentils, various peas and beans, mung (*Phaseolus*) and others are also grown. These supply additional protein in which rice is so deficient. The area is about 46 million acres. They are grown all over India and there ar many varieties : one or more can always be found suitable wherever any cereal can grow.

Oil is very important for Indian cookery and there are about 19 million acres of edible oil seeds,[13] but it is difficult to give an exact figure because the plants are often grown interspersed among other crops. India grows a greater variety of oil seeds in commercial quantities than any other country in the world : over 125 different kinds, wild or cultivated, are in use.[14] The chief are ground nuts, mustard,

[10] The plant breeding work is described by R. H. Richharia, *loc. cit.*

[11] The Howards' work is described in " Wheat in India," A. Howard & G. L. C. Howard, Calcutta, 1909—a series of papers in *Mem. Dept. Agric. India Bot. Ser.*, the last being in vol. 6, pp. 233–266, 1914. Later work is summarised by R. H. Richharia, *loc. cit.*

[12] Planning Commission, Sept. 1950.

[13] In addition 5 million acres of non-edible oil seeds are grown, 3·7 million of linseed and 1·4 million of castor (1949–50 figures).

[14] Richharia, *loc. cit.*

sesame (til). Ground nuts are grown chiefly in the central regions: Madras, Bombay and the Central Provinces. They are interesting as being among the few beneficent plant introductions into India, having been brought from America in early times (16th or 17th centuries) by the Portuguese or the Jesuit fathers. This success stands in marked contrast with some of the 20th century introductions which have become pestilential weeds and are proving very difficult to eradicate, especially water hyacinth. In addition a good deal of coconut oil is used, especially in the coastal regions of the south, where coconut is sometimes a staple food.

India's Average Food Supplies

These three sets of grains between them supply on the average something like 1,500 calories daily.[15] Jaggery, or gur, a hard brown mass obtained by evaporating the juice of the sugar cane, is very popular throughout India and is rich in calories: the output in 1949/50 was 4·9 million tons from 3·6 million acres or 1·3 oz. per head per day. Sundry root crops, fruits and vegetables, spices, curry components, "pan," etc., varying in the different parts of India, contribute rather to the flavours, stimulants and vitamins than to the calories.

In spite of the large live stock population the amount of animal food produced is very small. The reason is that the animals are far too numerous for the very small amount of food available for them. Slaughter of cattle is forbidden by Hindu religious law, the cow being a sacred animal: castration is rarely practised, breeding is uncontrolled. Reduction of numbers and controlled breeding are alike impossible, nor can the animal food supply be increased. Land cannot be spared for growing fodder crops. The animals must subsist on straw, weeds, wild grazing or other waste material, and are consequently very inefficient for work or milk production. Norman Wright in 1936 estimated the yield of milk per cow about 3 to 5 pints daily:[16] it is certainly less now. Buffaloes give about 50% more milk, and it is richer; indeed in spite of their low numbers they contributed in 1936 about half India's milk supply. Only about one-third is consumed in liquid form, and in the towns it is commonly adulterated; most of the milk is converted into ghee, a product something like butter but more concentrated. F.A.O. estimate that the whole supply of milk and milk products amounted on the average in 1949/50 to the equivalent of 4·3 oz. of milk daily, i.e. a little over one pint in five days. Meat is eaten only by few, about 5 lb. a year is the average consumption per head. Fish is still less eaten, and only by some living near the sea, including some high caste Bengalis; the average is about 2½ lb. per year. Widespread poverty and religious beliefs are the chief reasons; beef is forbidden to Hindus by their religious laws; pig is anathema in

[15] Note that 1 million tons of grain could provide the present population with about ¼ oz. per head per day for a year.

[16] Report on the development of the Cattle Dairy Industries of India (Delhi, 1937). A common milk yield in Great Britain is 2 to 3 gallons daily.

most parts of India ; mutton is eaten only by some, such as the Maratha cultivators. Muslims, however, eat both beef and mutton though not pork.

TABLE 4.

Numbers of calories and grams of protein per head per day supplied by the Indian dietary. (F.A.O.)

AVERAGE	1934/39	1948/49	1949/50	U. Kingdom 1950
Calories	1,968	1,621	1,702	2,990
Cereals (oz.)	14·8	11·3	12·2	9·6
Protein (grams) :				
Animal	8·5	5·8	5·7	46·0
Vegetable..	47·8	36·7	37·7	42·8

These figures are averages ; the range is rather wide : nothing approaching equality of distribution exists. There is much real hunger among the poorer people. Not infrequently I have been asked : " How many times a day do you eat ? " And I remember being accosted by a poor Hindu going into one of the very sacred temples from which I was debarred saying to me : " Give me money, and I will eat for you in the name of God." There is a system of rationing but it does not apply to producers and concerns only about 150 million out of India's 357 millions : for some time it stood at about 12 oz. a day, but then had to be reduced to 9 oz. and in some areas less. This has been accompanied by " procurement " of grain from the peasants, i.e. purchase at fixed prices. However, since they are below those of the black market the policy has been unpopular, and a flourishing black market has permitted evasion.

The rapid growth of population has not been accompanied by a corresponding increase in food production and in consequence the amount of cereals produced per head has fallen from nearly 15 oz. daily before the war, to 11 oz. daily in 1949/50, and the total calories per day from nearly 2,000 to 1,600 only.[17] This deterioration of the dietary had apparently begun before the 1930's : there are no strictly comparable data, but a number of observations and surveys suggest that in the earlier days more food grains per head were available. There had long been an export of wheat and oil seeds, but there was a corresponding or larger import of rice from Burma which not only supplied deficiencies but kept down speculation.

Part of the present deficiency of food grains is due to the loss of productive areas in the north now forming part of Pakistan, from which about 1 million tons of grain annually used to be drawn, and part to loss of imports of rice from Burma, but mainly it is the consequence of the smaller amount of sown land now available per head of population.

On any standard the present dietary is unsatisfactory : it provides insufficient calories, and is ill-balanced, being deficient in fats, proteins (especially animal proteins), vitamins and minerals. In 1944 the Nutrition Advisory Committee of the Indian Research Fund Association drew up a model dietary conforming to their accepted standards : it required an increase in the production of pulses and sugar of about

[17] Imports had provided an additional ounce of grain and 100 calories.

30% ; a five-fold production of fats and oil-seeds, four-fold production of vegetables, eight-fold of fish and meat, doubling the milk output and ending adulteration—a programme completely impossible of achievement in any foreseeable future.

A much more modest programme was adopted in 1948. It was to increase food production as much as possible by increased irrigation and by bringing into cultivation some of the land at present fallow or waste. The irrigation schemes are by far the most important: they include flood control and the setting up of hydro-electric schemes. They are costly, but help is being given under the Colombo Plan.

One of the most interesting of these schemes deals with the Damodar Valley region. The river rises in the hills of Chota Nagpur at the eastern end of the Vindhya Ranges: it flows south-east through Bihar and West Bengal entering the Hooghly river south of Calcutta. It is notorious for its liability to flood: it has caused the death of millions: the 1943 disaster in the Burdwan region led to a famine in which 1½ million people perished. It is naturally a vicious river but has been made worse by man. The headwater region has about 50 inches of rain a year, mostly falling between mid-June and mid-September. It was originally covered with forest, but this has been badly overcut and over-grazed, with the inevitable result of serious erosion and flooding. In July 1948, the Central Government established the Damodar Valley Corporation to draw up and carry out a comprehensive rehabilitation scheme. The whole of the catchment area—some 4 million acres—is treated as one unit. In the upland area the erosion damage is smoothed out by bulldozers; terraces, bunds, and other soil and water conservation devices are set up, and gullies are plugged to stop further erosion. Already this region, which had of late carried only meagre crops of millets, is beginning to grow wheat, and what is more significant, the water level in the subsoil is rising. One million acres are brought under direct control; 500,000 acres are to be grass and forest so as to reduce the amount of water run-off and consequently reduce the intensity of flood and soil erosion; 350,000 acres are to be arable land; and the rest is non-agricultural, villages, roads, etc.

The scheme for the lower part of the valley includes eight dams and reservoirs designed to provide storage for one million cusecs, this being 50% greater than the highest flood recorded (650,000 cusecs); when they are completed, therefore, there should be no repetition of the 1913 and 1943 disasters. The reservoirs will irrigate some 900,000 acres which should yield about 350,000 tons of food.[18] 240,000 kw. will be generated, but there will be considerable seasonal fluctuations, and in order to smooth these out additional steam plant is to be set up to generate 200,000 kw.[19] The cost of the scheme was estimated at

[18] This assumes an average yield of 870 lb. per acre, which is reasonable.

[19] Development of electrical energy is a prominent feature in the plan. The idea is to establish secondary industries on modern lines: apparently getting away from Gandhi's idea of reviving cottage industries.

Rs.680 million, but will inevitably be higher. Already work has had to be slowed down. but it is continuing, and in its comprehensiveness and quality it is an Indian counterpart of the Tennessee Valley Scheme.

The National Planning Commission on July 9th, 1951, published its first Five Year Plan. This includes additional irrigation of 8 million acres of land by major works and 7 million acres of land by minor projects : the cost is estimated at Rs.4,500 million. The irrigation extensions of 15 million acres in the Five Year Plan, together with the 4 million acres to be retrieved from fallow and the $1\frac{1}{2}$ million acres reclaimed from bush already mentioned will, the Commission estimates, increase production of food grains by $7 \cdot 2$ million tons, in addition to $2 \cdot 06$ million bales of jute and $1 \cdot 2$ million bales of cotton : an impressive achievement if it could be attained.

Among the most important of the reclamation projects are those dealing with the rehabilitation of eroded land. Loss has occurred both in regions of high and low rainfall. Overcutting and overfelling of trees in the high rainfall districts has led to much loss of soil and of subsoil water by increasing the run-off. In dry regions erosion occurs because of the difficulty of maintaining a protective vegetation cover ; over-grazing is common, the soil easily becomes reduced to dust and is liable to be carried away by the strong hot winds and especially the violent rainstorms. Fortunately the anti-erosion measures do not conflict with dry farming methods : some of them, bunding, terracing, etc., are used for both purposes.

It is difficult to estimate how much land has been lost by erosion because sheet erosion, the most widespread form, is also the least noticeable ; it takes off thin layers of soil perceptible only where careful records are kept, but continuing inexorably until in the end all the surface soil has gone. Basu estimates that the 70% of the $5\frac{1}{2}$ million acres in the scarcity tract of the Bombay Presidency have been more or less denuded, and about 32% rendered totally unfit for crop production. Much of this loss is recent.

Action on the recognised lines is being taken by the Agricultural Department to rehabilitate this land. The old-established experiment station at Sholapur has supplied the basic information and the Land Improvement Enquiry Committee went fully into various aspects of the problem. By 1948 some 722,000 acres had been provided with contour bunds and something has since been done to improve these by consolidation and the provision of waste weirs for dealing with storm water. A beginning has been made with the use of grass as a protective agent. Rehabilitation has not yet caught up with the losses caused by erosion and considerably more active steps are necessary.

More land could come into cultivation if better implements were available. Some 64 million acres of land that have been cultivated are left fallow, partly of necessity to build up a reserve of soil moisture, but partly also because the implements and bullock power are inadequate to get the sowing done in time.

More food could be produced if it were possible to store sufficient

moisture in the soil during the summer monsoon period to enable it to carry crops during the five or six months of the dry season instead of lying bare as at present. This possibility is being studied by soil physicists. In the meantime, something has been done by breeding or selecting early varieties of crops which can be cleared off the ground in time to sow another crop before the ground has become too dry. If there are winter rains it becomes possible to obtain two crops in one year.

One of the most effective methods of increasing output is by fuller use of manures and fertilisers. As already mentioned, Indian soils are poor by British standards, and good crop increases are generally obtained by applying manures and fertilisers. Quantities of cattle manure are produced but it is primarily used as a fuel, as is usual in dry countries where trees are scarce and there is no coal ; not more than 40% is estimated to get on to the land. The need for alternative sources of fuel has long been recognised ; the Royal Commission on Agriculture in 1928 had recommended the establishment of plantations near the villages for this purpose, but this was not carried out. Oil stoves would provide no solution unless they could be designed to provide the slow, low-temperature combustion needed for the village mode of cooking, the only one the women understand.

Vigorous attempts have been made to induce the towns and villages to convert their refuse into compost. Few of India's towns and none of the villages have water-borne sanitation and the potential quantities of compost are considerable : in 1950 they were estimated by the Agricultural Department at 20 million tons per annum from the villages and 5 million tons from the towns. Only a fraction of this however, is produced ; [20] but even if all the potential quantities were made they would still suffice only for about 4 million acres out of the 236 million acres sown.

By far the most hopeful means of increasing yields per acre is by the use of fertilisers, chiefly nitrogenous, in many cases phosphatic, but rarely potassic or lime. W. Burns estimates that by their proper use crop yields could be raised from 30 to 100%.[21] The difficulty is supply. To give only an average of 20 lb. nitrogen per acre to India's 236 million acres of sown land would need 2 million tons ; but as the world's present output of combined nitrogen is not much above 4 million tons, the International Pool could allocate to India only 100,000 tons nitrogen in 1949—5% of its desirable quantity even if India could have paid for more. A fertiliser factory is to be set up at Sindhri as part of one of the new water utilisation schemes, and this is hoped to produce by 1955 half a million tons of fertiliser—including about 75,000 tons of nitrogen—but a vastly greater need will remain

[20] See A. Acharya, *Bull. 60, Indian Council Agric. Research*, New Delhi, 1950 : and also the Compost Bulletins issued by the Dept. of Agric.

[21] W. Burns, *Technological possibilities of Agricultural development in India*, Dept. of Education, Health and Lands, Govt. of India, 1944. The experimental material is summarised and discussed by A. B. Stewart, *Rept. on Soil Fertility nvestigations in India*, Delhi, 1947.

which can be satisfied, if at all, only by imports from the west. Adequate supplies of phosphatic fertiliser are equally difficult to secure: certain quantities of bones are available, but nothing like enough.

Another possibility of increased production is by use of new varieties of old crops. An enormous amount of work has been done in India during the last 50 years on the selection and breeding of improved varieties of crops, particularly the cash crops, sugar cane and cotton, and wheat, which was an export commodity when the work began. About 87% of the total area of sugar cane is now under improved varieties, but only about 20% of the wheat area and probably less of the rice area. For the other food crops, millets, pulses and oil seeds, the area is certainly much less. The position may be better than it looks as no good statistics are available, but the result is a disappointing return for so much devoted scientific work.

One important reason is the absence of any good link between the plant breeder and the cultivator. While the sugar factories and the cotton ginneries can ensure the use of good varieties, there is no seed-trade with high standards of efficiency and probity which can take over promising sorts of food crops, multiply and distribute the seeds in pure condition. At present such work as is done is by Government Agency, but it is hampered by the poverty of the peasants and in places by the temptation to sell the issued seed in the black market rather than await next year's harvest.

Finally, there is the reduction of waste and losses by insect and fungus pests, which present serious problems to the plant pathologist, the entomologist and the mycologist.

Conclusions

India still has considerable possibilities of increasing food production. Experimental farms commonly obtain yields well above the average, showing that the peasants could produce much more food than they do. Why do they not use the better methods? The obvious reason is their deep seated poverty. The holdings are usually small, often scattered and generally uneconomical to operate. The oxen are inefficient, too ill-fed to be able to work well; implements are clumsy so that cultivations are often not done to time and sowing may be late or missed altogether. There is so little fuel that the cow-dung which ought to go on to the land must perforce be burned. This poverty is an important factor in causing famine, it prevents the building up of reserves. The Famine Commission of 1945 reported that in 1943, the year of the terrible Bengal famine in which over a million people perished, the total food deficit for the whole year was only three weeks supply. The poverty is said to be getting worse.[22]

A contributory cause of the low level of productiveness in some districts has been the system of land tenure based on share-cropping,

[22] L. Kripalani—an official of the Congress Party. The United Nations estimate is that the national annual income in India is $57 per head compared with $773 in the United Kingdom and $1,453 in the United States.

which often acts as a deterrent. It is intended to abolish this and replace it by peasant proprietorship and some form of co-operative farming. Something of the kind has been accomplished in the tube well areas and may yet be achieved for purposes of tractor cultivation. The ultimate goal, as the Planning Commission recognises, is the change from the old subsistence farming to modern economic farming.

The main difficulty in my view lies in the lack of effective social and agricultural leadership in the Indian villages. Men are trained for the purpose but they do not take it up. Good agricultural colleges have been operating for 50 years but the students want Government or similar jobs, not farms. Courses for peasants' sons are well attended, but these young men, too, want jobs, not a return to their fathers' holdings. The fact is that the villages are unattractive, often unsavoury, insanitary and unhealthy; and people who can leave them do so. The result is an almost complete absence of the good farmers who in Great Britain have always been the best instructors of their neighbours. Unfortunately it is a vicious circle: the farming cannot improve until the villages are made more attractive, and the villages cannot become more attractive until the farming improves. Much was done by devoted pioneers like F. L. Brayne, Malcolm Darling, Higginbotham and others, but the circle can be broken only when the village welfare movement becomes a vocation for India's young people, and they realise the truth of Tagore's saying: "In the keeping of the village lies the cradle of the race." The task is enormous for there are some 700,000 villages or more, and if one may judge from income tax returns, the total middle class population of India—from which the leadership must come—is only about half a million.

The problem of feeding India, however, will remain extraordinarily difficult or even insoluble if the population continues to increase at its present rate. Even to maintain the present low standards of nutrition about 32 million acres of land would need to be added to the cultivated area in the next ten years, or, alternatively, the output per acre increased by 15%, or some 12 million additional acres brought under irrigation. These extensions may be possible but would certainly be extremely difficult. India's leaders now recognise this; "family planning" is definitely advocated by the Planning Commission and approved by Pandit Nehru. A movement in that direction set in after the 1914–18 war: the birth rate which had been 37 per thousand in the decade 1911 to 1920 fell to 25·4 in 1948. The death rate, however, showed a still sharper fall—from 34 to 17—so that the population increase still went on.

This is India's problem; but in the last 200 years so many links have been forged between our two countries that we can never cease to be interested in her welfare.

THE INDIAN VILLAGE

O. H. K. SPATE, with a contribution by C. D. DESHPANDE.*

THE VILLAGE IN GENERAL

THE phrase " a land of villages," so frequently applied to India,[1] is true but pointless ; any mainly agrarian country is a land of villages. There is some point, however, in noting the actual size of population units. Of the 658,595 inhabited localities of India in 1941, some 654,000 had under 5,000 people and no fewer than 450,902 under 500. Settlements of under 5,000 held 315,000,000 souls—80% of the total population.

The great majority of the country folk, then live in small or large nucleated settlements, and areas of dispersed habitations are few : the Himalayan zone, and by no means all of that, is perhaps the only extensive area where there is much true dispersal of the type found in European highlands. But elsewhere in the hills, and in many parts of the Himalayas themselves, the unit is the small hamlet rather than the homestead.

In the arid west this is enforced partly by the paucity of water-points, partly by the needs of defence—needs still visibly attested by the watch-towers of Pathan villages. Among the tribes of the Assam-Burma border defence is also an important factor ; villages are on hill-tops or spurs, often stockaded ; but it must be remembered also that the valleys of the wet jungly hills are extremely malarial, and that communication is easiest along the relatively open ridgeways.

Bengal—especially the eastern delta—is *sui generis* : there is, indeed, much settlement that is not nucleated, but " dispersal " seems an exceedingly inappropriate term for the dense stipple of separate homesteads, hardly isolated except in the most literal sense of the word when, during the rains, each is an island on its little earthen plinth, which in turn has been built up from the individual tank (Fig. 1). From the air this is a landscape of the most delicate beauty, compounded of all shades of green from the almost luminescent young paddy to the dark mangoes, and diversified by the clumps of bamboo clustered round the tanks.[2]

Other areas of more or less dispersed settlement are those of recent or temporary reclamation, by squatters in the Assam jungle—the last reasonably easy farming frontier of India, or by farmers in the great floodplains where they use the rich *khadar* (newer alluvium) for high-value crops after the rains. But in both groups the very small

* Professor Spate, it will be remembered by many, left a Readership at the London School of Economics to become Director of the Research School of Pacific Studies at the Australian National University, Canberra.

Mr. C. D. Deshpande is Lecturer in Geography at the Karnataka University, Dharwar, Bombay.

[1] In this article " India " refers to the entire sub-continent.

[2] For an admirable description, with plans of homestead-types, see J. C. Jack, *The Economic Life of a Bengal District*, Oxford, 1916, pp. 16–38.

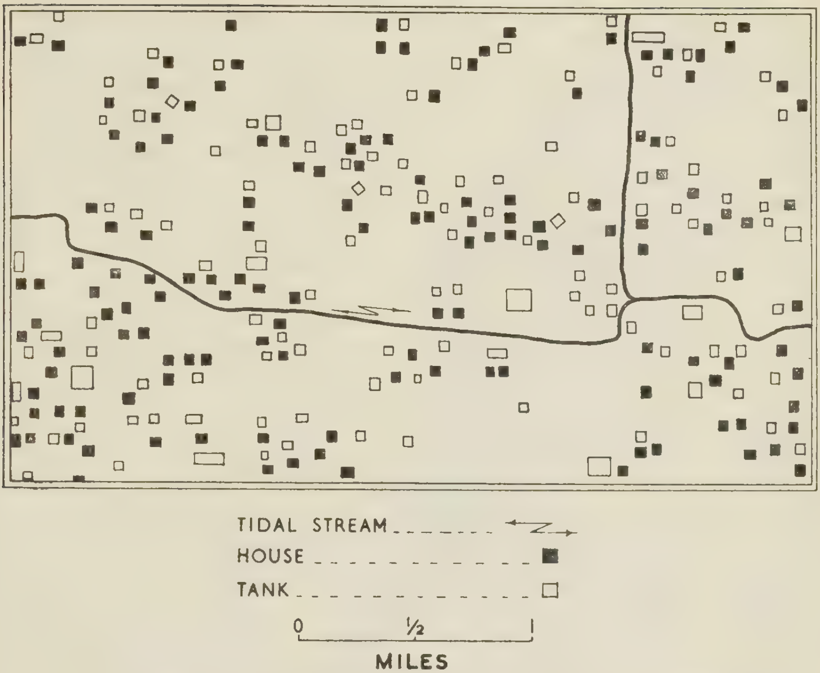

Fig. 1.—Noakhali District, East Bengal, 9 miles northeast of Noakhali town. Note the large number of tanks. Reproduced by courtesy of the Survey of Pakistan ; 1/63, 360, sheet 79 N/1.

hamlet of, say, six to twelve huts is the rule, rather than true dispersal, and in the second case the huts are often only temporary, inhabited during the dry weather by people normally resident in big villages on the bluffs above.

These, however, are anomalies : in the great homogeneous plains nucleation is almost invariable, and the spacing of settlements remarkably uniform ; there are large areas where Christaller's hexagons fit to perfection.[3] In the past defence played its part in enforcing close grouping, and in areas which were open to almost constant warfare (e.g. the Sutlej-Jumna and Jumna-Ganges doabs, Rohilkhand, the fringes of central India, the Raichur (Kistna-Tungabhadra) doab villages are often grouped around a petty fort ; even to-day the close-packed houses, with blank outer walls and low doorways, massed into a ring with few entrances, present a markedly defensive aspect. Often there is not much in the way of site selection ; one place is as good as another, and the village rises are as often as not their own creation, the rubbish of generations. But any discontinuity, any break in the almost imperceptible slope, produces linear settlement patterns ; especially notable are the bluffs above floodplains and the margins of

[3] For the hexagons illustrating the hierarchy of service centres in homogeneous agricultural areas, see R. E. Dickinson, *City, Region, and Regionalism*, London, 1947, pp. 30–35 ; and for a good Indian example, the Jumna/Ganges doab, especially between Agra and Aligarh.

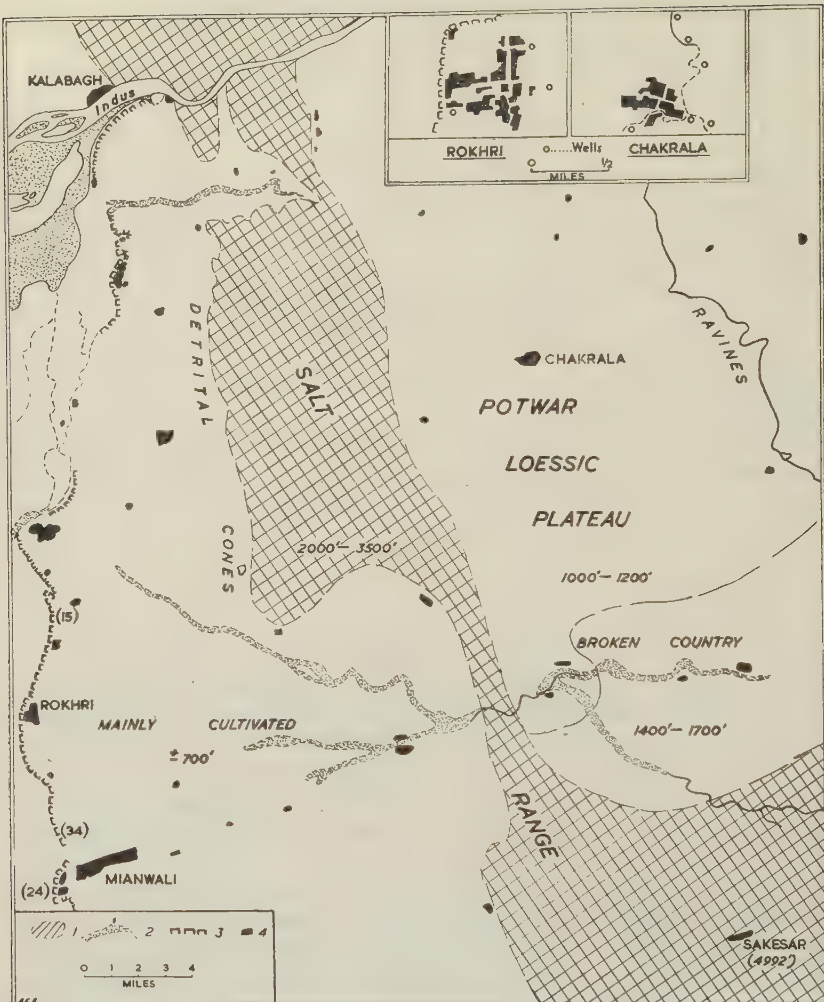

Fig. 2.—Mianwali and Attock Districts, West Punjab. 1, Highly dissected arid hills, thin scrub or bare; 2, main wadis; 3, bluffs of Indus floodplain; 4, settlements. The Potwar plateau is largely cultivated but with much ravining and badlands (*khuddera*); most of the streams are seasonal (indicated by broken lines on Chakrala inset). Figures such as (35) indicate height of bluff, in feet. Reproduced by courtesy of the Survey of Pakistan; 1/126, 720, sheet 38 P/NE.

abandoned river-courses. Bluff villages (Fig. 2) tend to be larger than those on the drier inter-fluves; they have the advantage of two types of terrain, the upland doab and the valley-bottom with the excellent silts of its *chars* or *diaras*—the floodplain islands—submerged in the rains and liable to disappear completely during floods, but always cropping up again sooner or later. Cultivation here is risky but rewarding; these alluviated areas are often given over to cash crops of

high value, and near large towns to market gardens easily irrigated from wells in the high water-table.

Settlement lines tend to occur also at the marked break of slope where steep residual hills grade into a fan, which has usually a fairly high water-table and is possibly enriched by soil-wash. There are suggestions of a similar line along the flanks of the Salt Range on Fig. 2. Lateritic shelves along deltaic margins are also important building sites, poor land in themselves but offering rough grazing and scrubby

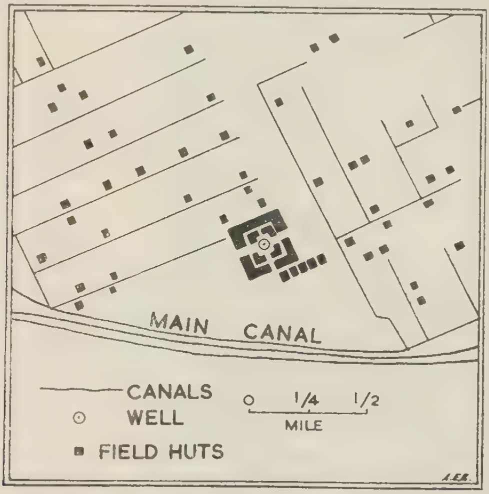

Fig. 3.—Planned village in Lower Chenab Canal Colony, Lyallpur District, 70 miles southeast of Lahore. All cultivated except triangle between village and main canal. Reproduced by courtesy of the Survey of Pakistan; 1/63, 360, sheet 44 E/8.

woodland (supplier of a great range of minor needs from timber and thatch to illicit alcohol), and providing space for dry crops, the flats below being entirely under paddy. These shelves form, as it were, neutral ground between the jungly hills and the water-logged paddy plain. Here not only the general arrangement of settlements but the village itself is markedly linear; islands of lateritic and older aluvium in the deltas are often completely ringed with houses. Linear settlement is also, of course, prominent in the deltas and wider floodplains themselves, strung out along embankments or natural levées, and in places (e.g. Malabar and the Contai area of south-west Bengal) along old beach-ridges. Very often such sites are the only dry-points in the rains and the only water-points in the hot weather.[4]

There is in general very little that looks like a "plan," other than that dictated by such site factors as alignment along bluffs or levées (see Fig. 2, insets), grouping around a fort or tank; but within the seemingly chaotic agglomeration there is, as a rule, a strong internal

[4] For examples and analogues see G. T. Trewartha, *Japan*, 1945, pp. 163–67 (especially Figs. 64 and 68); E. H. G. Dobby, "Settlement Patterns in Malaya," *Geogr. Review*, vol. XXXII, 1942, pp. 211–32; O. H. K. Spate, "The Burmese Village," *ibid*, vol. XXXV, 1945, pp. 523–43 (especially Figs. 12–17).

differentiation, that of the separate quarters for the various castes. An exception to the lack of planning is afforded by the strictly rectangular villages of the Punjab Canal Colonies (Fig. 3), reminiscent of a Roman *castrum* and a complete contrast to the villages of the older-settled strip along the great piedmont route of the northern Punjab. Here, as Darling remarks, is the real India, " hot and prickly but above all warm-hearted " ; the Canal villages are alien and severe in many cases, officially numbered, not named. But even in the Colonies untidiness creeps in.

A Village in Detail

These points are best brought out by a close view of a specific village (Fig. 4, Plates I to VI), not indeed " typical " (no single village could be that) but certainly the most random of samples. Our exemplar is from the Deccan, more precisely the Bombay Karnatak.[5]

Fig. 4.—Aminbhavi, Dharwar District, Bombay ; from survey by C. D. Deshpande. 1, Harijans ; 2, Muslims ; 3, Talwars ; 4, Shepherds ; 5, Lingayats ; 6, Jains ; 7, Brahmins ; 8, Shops, etc. BS, GS, US, Boys', Girls', Urdu Schools ; G, B, T, Grocers', Bania's, and Tea-Bidi shops ; PO, PS, Post Office, Police Station ; D, Dispensary ; Gd, Government Grain Godown ; VP, Village Panchayat ; M, Lingayat Math ; Sh, Shikalgars.

Aminbhavi lies seven miles north-northeast of Dharwar, an old settlement, going back at least 13 centuries, originally walled and moated (Pl. II). Essentially its site is governed by the junction of the Dharwar rocks, forming poor red soils around the mosque-crowned hill to the west, with the crystallines which have weathered into a deep

[5] The chance of a correspondence with Mr. C. D. Deshpande of Karnataka College, Dharwar, led me to appeal to him for a sample survey ; the choice was left entirely to him. Nothing could be more random and free from preconceived selection. I am deeply indebted to Mr. Deshpande and his students for the very full and admirable maps, notes, and photographs, on which this section and its illustrations are entirely based.

Plate I.—General view of Aminbhavi, looking east from Idgah (Mosque) Hill. Terraced *gauthana* in foreground, backed by line of old moat ; beyond village the black soil plain. The large gabled building in the centre is the Desai *wada*.

Plate II.- Aminbhavi; old moat and wall, looking north. Harijan huts on extreme right.

Plate III.- Shikalgar huts; Idgah Hill on left skyline.

black soils, with a rainfall of about 24 inches, devoted mainly to dry crops (cotton, jowar, wheat, pulses, safflower, in that order); it is tending to become a satellite of Dharwar, the market for its dairy and black cotton soil to the east. It is a typical agricultural village on the agricultural produce. On the poorer land to the west is rough grazing, supporting a few shepherds, and immediately west of the village is the common or *gauthana*, an essential part of its economy, the centre of all harvesting (Pl. I).

Caste and community largely govern the lay-out. Of its 4,106 inhabitants, Lingayats, the sturdy agricultural caste of the Karnatak, number some 2,650. Next come 550 Muslims, an unusually high proportion, but the place was of some importance in the days of the Sultans of Bijapur (16th–17th centuries) and the first element of its name is indeed that of some forgotten Muslim notable (Aminbhavi = roughly Amin's Well). But the culturally dominant groups are the Jains (250) and the Brahmins (75). This is an *Inam* (landlord) village, most of it belonging to the Desai (Jain) and Deshpande (Brahmin) families, whose *wadas* (more or less equivalent to manor houses) stand within large compounds on the best sites (Pl. I). The Desais provide the *patel* or village headman. For the rest, each caste tends to occupy a solid block of contiguous houses in a lane named from the caste; where, as with the Lingayats, several lanes are occupied, each is named from the leading family residing in it. Besides the groups mentioned, there are 300 Talwars (domestic servants and agricultural labourers), 200 Harijans ("untouchables"), and smaller groups of other low castes—Wadars (quarrymen), Shikalgars (backward semi-nomadic casual labourers), washermen, and so on. These groups live on the circumference of the village, or even beyond the old moat (Fig. 4).

Occupations likewise are still mainly on a caste basis: the Lingayats provide the bulk of the tenant-farmers, Talwars and Harijans landless agricultural labour; carpenters (Pl. IV), smiths, cobblers, washermen, barbers are all separate castes. Apart from these crafts and agriculture, there is some handloom cotton weaving, a subsidiary occupation of the Lingayats.

Except among the Jains and Brahmins, houses are generally built on to each other, or at least the mud walls of the compounds are continuous (Pl. V). The house lay-out is as standard as in any English working-class street. In front is a verandah or open porch (*katte*), used for drying agricultural produce, as a formal reception "room," as "a place of female gossip when the master of the house is out," and above all as a sleeping place in the stifling summer nights. Behind this is the main room, some 25 feet square, part of which is a cattle pen at threshold level; the remainder, raised some two or three feet, is the general living-room, for sleeping, eating, more intimate entertainment of guests, and perhaps for handicrafts. The most prominent object is the pile of grain stored in gunny bags, sadly depleted towards the end of the agricultural year. Behind is a separate kitchen (with a corner for the bath) and the backyard with manure-pit

and straw-stacks. This is the standard pattern; construction is similar in all groups (except the lowest), differences in economic status being reflected merely in size, except that the well-to-do have more separate single-purpose rooms. The Jains and Brahmins do not live so tightly-packed as the rest, either in the spacing of their houses or within them.

The poorest castes live in wretched one-room mud or wattle-and-daub huts with thatched roofs (Pl. III). Apart from these all houses have walls of mud-brick, one or two feet thick with few (and high) or, more likely, no windows: Indians in general have a doubtless well-founded burglar-phobia. The flat roof is supported by wooden posts and made of mud on a framework of crude beams and babul (acacia) branches; it has rounded mud parapets and clay pipes to take off rain-water (Pl. V).

As for services, these are mostly grouped around the main village lane: marketplace for the weekly bazaar, eight shops (four grocery, two cloth, one tailor, one miscellaneous) and a number of booths selling tea and *bidis*, the cheap crude "cigarettes" of the Indian masses. Near the marketplace is the village *panchayat* or caste council, an ancient institution which fell into desuetude under the impact of the tightly-organised British bureaucracy, but now being fostered as the first step in local self-government. Associated with this tiny "urban core" are the government establishments—police station, post office, grain warehouse. There are three mosques, one giving its name to the Idgah Hill west of the village, and eight temples, including that of the Deshpandes, as well as the Lingayat *math*, a centre of religious fellowship and charitable assistance to castemen. The professions are represented by an Ayurvedic (indigenous) dispensary, an Urdu school for the Muslims, and separate schools for boys and girls. The boys' school is the most modern building in Aminbhavi, its stone walls and red-tiled roof standing in sharp contrast to the monotony of mud walls. There are also, of course, the ubiquitous *banias*—traders, grainbrokers, and moneylenders.

Finally we may note the large masonry-lined public well, now open to Harijans; as Pl. VI shows, it is no mean excavation, an apt reminder of the all-importance of water-supply in Indian life.

Once more, no one village can be typical of the whole sub-continent; but many of the features detailed above can be paralleled over and over again in most parts of India. Our random sample is at least very representative.

The Village: its Aspect and Life

The aspect of the village varies not only with the general regional setting, with building materials and house-types, but with social factors. In southern India, the generally greater emphasis on caste takes social fragmentation allied with spatial separation to the extreme, segregating the untouchables in outlying *cheris* or sub-villages, sometimes located several hundred yards from the main villages of which they are service-components. This is indeed the climax of geographical differentiation:

apartheid. A typical *cheri* may consist of two rows of huts with a narrow central street ; in the middle this widens to make room for a tiny temple.[6] The huts have thick mud walls, roofed with palmyra thatch, and low mud porches scrupulously swept. To enter, one must bend double ; the only light comes from the door and from under the eaves, and the furniture consists of a few pots and pans, a couple of wooden chests, and the essential paddy-bin, four to six feet high and three to four in diameter, built up of hoops of mud and raised from the ground to escape the rats. Poor as they are, these dwellings are yet homes, and obviously loved as such : their cleanliness, the surrounding mangoes, coconut and palmyra palms, redeem them from utter squalor. The nadir is reached in the *bustees* of Calcutta—shacks jammed so close together that the internal structure of a *bustee* area can only be photographed when half of it has been burnt in a communal riot[7]—and in the revolting camps of casual tribal labourers on the outskirts of the larger towns : shelters (they cannot be called even huts) of matting, of rags, of petrol tins beaten flat, on waste spaces open to the sun and reeking with filth.

A geographical study of Indian house-types would be a work vast in scope and rich in instruction.[8] Social factors are no less important than environmental, at least once we go beyond the fundamental antithesis between the south-west Asian flat-roofed type found in the dry north-west and the thatched gables of the more humid areas, and beyond the elementary dictates of availability of stone, wood, brick, or mud. Not only the site and lay-out of the village, but " the geography of the house " often reflects age-old religious and magical traditions : the round Telugu huts, with bold vertical stripes of white and rusty red, are clearly culturally rather than geographically influenced. At the other extreme from the rude massive stone huts of Bundelkhand we have the elaborate courtyard house of the richer farmer of Uttar Pradesh (United Provinces), with some pretensions to elegance—the survival of decayed traditions—in doorways and arcading. Some Indian domestic building indeed reaches a very high standard of artistry : the carved timber of the Kumaoni Himalayas or of the small towns of the Konkan, the restrained but excellent brick details and the very pleasant white bungalow-type houses, with low gables of semi-cylindrical tiles, found in the Maratha country.

Environmental influences are well seen in the flat-roofed blank-walled boxes standard in the Punjab and western Uttar Pradesh ; thick-walled and dark, designed to trap and keep what coolness is possible. These are strongly reminiscent of arid south-west Asia, and fit well into the four-square planned villages of the Canal Colonies.

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[6] Often put up by the pre-war Congress provincial governments as a concession ; in 1943 one such had been decorated by the children with ARP signs.

[7] The most comprehensive survey of a large area that I have seen is in Enayat Ahmad's most excellent London Ph.D. thesis (unpublished), " Settlement in the United Provinces " (1948). This deals with both rural and urban settlements.

[8] Binapani Mukerjee, " The Hooghly and its Region," London Ph.D. thesis (unpublished, 1947).

Against these may be set the Bengal house, walled with bamboo matting, which lets plenty of draught through in the hot weather and in the rains swells to stop up the cracks ; the thatched gables are pitched high to shed the rain, and ingeniously designed to take the strain of cyclonic gales, while in well-to-do houses the gable may be in two stages with a clear space between. Such construction is admirably suited to hot humid conditions ; for mere comfort (neglecting the obvious risks of vermin and fire) the writer would sooner live in a " bamboo basha " than in a European-style bungalow any day, though better than either are the few survivals of old Portuguese building, with stone walls two to four feet thick and cool marble floors.

In Madras " we see flat-roofed stone houses in the Ceded Districts (Deccan), so constructed as to protect the dwellers from the severe heat of the sun, the rocks and slabs locally available being used. In contrast we find in Malabar timber entering into the construction. Here the buildings are on high ground and have sloping roofs, both necessitated by the high rainfall. . . In the Tamilnad we have tiled brick houses with open courtyards, reflecting an equable climate and moderate rainfall."[9] It must be added that corrugated iron spreads wherever there is easy access to a railway ; it has the great merits of being fire-proof and being less fostering to vermin than is thatch, but is about as unsuited to the climate as it is possible to be. Its use is largely a matter of prestige, a symbol of wealth ; in some areas a good compromise between the climatic comfort of thatch and the lessened fire-risk is obtained by putting a roof of corrugated iron or of tiles over thatch.

As for what life in the Indian village is really like, who knows save the Indian villager ?——a few officials like M. L. Darling, whose Punjab rural rides[10] compare with Cobbett's, a few devoted social workers, Indian and European, Christian and otherwise. But even then there is the difference between living in the village from cradle to grave[11] and living in the village with one's territorial—and social and psychological—base outside. The alien may perhaps glean something from that rich harvest of salty rural proverbs (a comparative regional anthology of them would be fascinating) which are as vital a part of India's cultural heritage as the lyrical and metaphysical visions of her sages. Not that this latter strain of culture is wanting from the village : the great epics *Ramayana* and *Mahabharata* pass from lip to lip in folk-versions : to some extent at least every man is still his own poet, improvising as he walks to his work or sits in the cool of the evening ; and not a few of the noblest figures in India's predominantly devotional literature have sprung from the villages rather than the

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[9] K. M. Subrahmanyam, " Four Main House Types in South India," *Journ. Madras Geogr. Assocn.*, vol XIII, 1938, pp. 168–75.

[10] *The Punjab Peasant in Prosperity and Debt* (1928) ; *Rusticus Loquitur* (1930) ; *Wisdom and Waste in the Punjab Village* (1934) ; *At Freedom's Door* (1947).

[11] The phrase betrays me and makes my point : it is more likely to be cradle to burning-ghat.

Plate V.—Poorer houses in Washermen's Lane. Note close-built houses, open porches, rounded parapets, clay rain-water pipes and little shrine.

Plate VI.—Public well, looking south. Main road to Dharwar runs by building in background.

schools——Kabir the Weaver, Tukaram. It is significant that the Communist Party has found its most effective translation of its modernising propaganda in the traditional media of song and dance. The things that strike the outsider, then, are perhaps not ultimately the most important : the flies and the sores, the shrill clamour of gaunt pi-dogs, the primitive implements, the utter lack of sanitation.[12]

At its worst the Indian village is infinitely depressing : in the great alluvial plains where so much ground is cultivated that the scanty village site cannot grow with its growing population, or where a few miserable huts cling to shadeless stony rises in the drier parts of central India or the Archaean Deccan. Yet cheerfulness keeps breaking in, despite the most adverse circumstances ; fatalist as he is and must be, the peasant often displays an astonishing resilience, and, some particularly hard-pressed areas apart, refuses to be broken by his often bitterly hard physical and social environment. And over much of the land the villages have their amenities, their beauties even : in the plains and deltas they rise out of the sea of arable, emerald or gold or drab stubble-grey according to season, like dark green islands, shaded in mango or orange trees, tamarinds, bamboos, palms. The tank or the well,[13] the shade of the great banyan or the porch of the headman's hut, are essentially free clubs for the women and the menfolk respectively.

Though the substratum of life—the gruelling round of the seasons—remains and will ever remain the same, though a miserable livelihood exacts an exorbitant price in endless toil, there have been great changes since Edwin Montagu, Secretary of State for India in 1917–19, spoke of the " pathetic contentment " of the Indian village. Pathetic it still too often is ; contented, less and less ; which is as it should be. " These idyllic village communities confined the human mind within the narrowest possible compass."[14] This is overstated ; there *were* the epics and the proverbs ; but the horizons were far too narrow for a full life. Now new motifs are changing the tempo of life in the larger villages ; perhaps a communal radio, perhaps a mobile film unit, more and more frequently a school. The mass movements launched by Congress were not always amenable to a thus-far-and-no-farther policy ; the peasant had other enemies than British imperialism, and Congress taught him organisation : it is no great step from a no-tax to a no-rent movement. Then, as in Tsarist Russia and in Africa or New Guinea to-day, there are those powerful catalysts of social change, the factory worker retaining his links with the village, the soldier from the wars returning. All are helping to break down the isolation and the

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[12] Whence the richer crops on fields immediately adjacent to the village ; a difference officially recognised in land revenue assessments. In Burma the villagers manage these things better, though the result of following a too well-trodden path into the jungle may be nearly as embarrassing as the more casual ways of India.

[13] The equivalent of the British housewife's queue.

[14] K. Marx, " The British Rule in India " (*A Handbook of Marxism*, 1935, pp. 179–86).

lack of information which rendered the villager so helpless a prey to the moneylender, the shopkeeper, and the grainbroker—often all three being one and the same person. Perhaps the most powerful agent of change is the battered ramshackle motor-bus, packed to the running-board and coughing its way through clouds of dust along the unmetalled roads to the nearest town.

There may be, there probably is, loss as well as gain in all this. But it is idle to bewail the break-up of integrated codes of life——codes too often integrated by religious, social, and economic sanctions which were a complete denial of human dignity. In any case the disintegration set in long ago, with the advent of the new all-embracing (and to the peasant generally restrictive) administrative standards of the British Raj and with the impact of the world market.[15] It is high time that new horizons should be opened, that the villager should see whence the forces that have subverted his old life have their origins, and what of good they may bring.

[15] "These small stereotype forms of organisation . . . are disappearing, not so much through the brutal interference of the British tax-gatherer and the British soldier, as the working of English steam and English free trade." K. Marx, *loc. cit.* This brilliant analysis—the whole is well worth reading—was written just on a century ago (1853).

THE BOUNDARIES AND POPULATION PROBLEMS OF ISRAEL

C. G. Smith*

Introduction

It is the aim of this paper to consider some of the results of the disappearance from the political map of the former British Mandated Territory of Palestine. The consequences and lessons of this event are only slowly being realised, yet they are of considerable strategic, political, economic and religious significance, and offer many unique opportunities for studies of geographical interest.

It was the decision of the United Nations General Assembly in November, 1947, to partition Palestine along the lines recommended by the majority of the U.N. Special Committee that made possible the establishment of a Jewish State ; but it was the refusal of the Arab League States to accept this decision, their resort to arms, and their failure to prevent Israel from enlarging its territory in the fighting which followed the Declaration of Independence on 15th May, 1948, that resulted in the present boundaries of Israel. The boundaries emerged after U.N. intervention had ended three rounds of hostilities, and were originally merely armistice lines. Since the last cease-fire,

* Mr. Smith is a University Lecturer in the School of Geography at Oxford and has been a student of the geography of Palestine since he visited the country while on war service.

in January, 1949, these armistice lines have in fact become provisional boundaries, in spite of numerous violations of the truce, and border incidents (see Fig. 1). No Arab state has yet, however, signed a Peace Treaty with Israel; but the legal position is obscure, since in order not to recognise the existence of the country no Arab state ever declared war on Israel.

The political stability of the Middle East and the attitude of the Arab world have been influenced by the much-resented appearance in its midst of a state alien in religion, language and culture, which by its capital resources, technical skill and advanced political and social ideas represents all that is considered disruptive of traditional Arab life, yet in many respects sets an example which cannot be ignored in the Middle East. The significance of the Canal Zone base has been increased by the British withdrawal from Palestine, and the mutual hostility of Israel and the Arab states has rendered it more difficult to organise a regional defensive pact in this area.

The geographer can here study the settlement (presumably final) of a minority problem which has prompted a large number of proposed solutions in the past,[1] and the evolution of a boundary which still leaves many problems unsolved. A very large population exchange has occurred, and the mass migration movement into Israel is likely to continue for some time. The resettlement of the displaced populations, on both sides of the boundary, raises the question of the extent of cultivable land in the Middle East, and requires detailed studies of irrigation prospects and soil surveys. Much of this work is at present hampered by political difficulties. Finally, Israel is a state where economic development is purposely planned in great detail in exceptional conditions of capital investment and pioneer enthusiasm;[2] and the changes produced in the human geography of this small country afford opportunities of making studies of an interesting nature in an area where good maps are available, and the physical environment has been more adequately studied than elsewhere in the Middle East.

Boundaries

Fig. 1 shows the boundaries proposed by the U.N. Special Committee on Palestine, and adopted by the General Assembly for the partition of Palestine on the termination of the British Mandate, together with the present boundaries of Israel. The principal difference is that Israel now has a continuous boundary enclosing a homogeneous area. The Arab area of the Gaza coastal strip, occupied by Egypt, is smaller

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[1] Nine different partition plans may be found in the following official reports and publications:—

(a) *Palestine Royal Commission Report*, Map 8, Cmd. 5479, H.M.S.O., 1937.
(b) *Palestine Partition Commission Report*, Maps 7, 8, 9 and 10, Cmd. 5854, H.M.S.O., 1938.
(c) *Proposals for the Future of Palestine*, Cmd. 7044, H.M.S.O., 1947.
(d) *Report to the General Assembly by the United Nations Special Committee on Palestine*, H.M.S.O., 1947.

[2] See: A. Hazlewood, "Problems of Israel's Economy," *Oxford Univ. Inst. of Stats. Bull.*, Dec., 1950.

than that awarded to the proposed Arab state. It has recently been suggested in some quarters that this territory be given to Great Britain as a military base after withdrawal from the Canal Zone. The rest of Arab Palestine, the Samarian-Judean hill country, has been absorbed into the Kingdom of Jordan. This hilly area had always been solidly Arab in population except for the Jerusalem region. In Judea Israel holds a wide corridor leading to the Holy City, and most of the low dissected hills of the Shephelah at the foot of the main limestone uplands of Judea. Jerusalem itself is partitioned between Jordan and Israel in a most unsatisfactory manner for all concerned. The Hebrew University on Mount Scopus is in Jordan; the Bethlehem road is controlled by Israel, while the town is in Jordan; and the Holy Places in the Old City of Jerusalem are controlled by Jordan, and difficult of access from Israel.

At the foot of the Samarian hills the boundary is very similar to that considered in 1937 and 1938, even to the extent of cutting the main Haifa–Lydda railway at Tulkarm and Qalqilya, both now held by Jordan, although the railway is operated by Israel. A new and more direct railway line between Tel Aviv and Haifa has now been built via Hadera, through a more densely settled area.[3] Between a point east of Jenin and the Jordan Valley, the boundary follows the crest of the mountains of Gilboa, and is very similar to previously suggested solutions, for both the topography and the extent of Jewish owned land made a solution simple, whether by agreement or by force of arms. Israel's coastline on the Dead Sea is longer than that originally awarded, but she has lost the more valuable of the two potash works, that at Kallia at the northern end. Israel holds the whole of the Galilee hill country, which had a large Arab population. Elsewhere the boundaries of Israel are those of the former mandated territory, and rather less open to dispute than the new ones. However, the development of the Huleh swamps has already caused border incidents, and the proposed use of Jordan and Yarmuk water by Israel can bring out latent possibilities of dispute over the boundaries inherited from Palestine.

Unfortunately in Judea and Samaria many Arab villages are separated from part of their former lands, which are now within Israel. Almost any boundary along the edge of the hill country would have had this effect.[4] The distribution of Jewish and Arab villages before partition is shown in Fig. 2. The major obstacle to partition in the past, the distribution of the Jewish and Arab populations, has been settled in a manner more drastic than any partition commission had really considered possible or had dared to suggest.[5]

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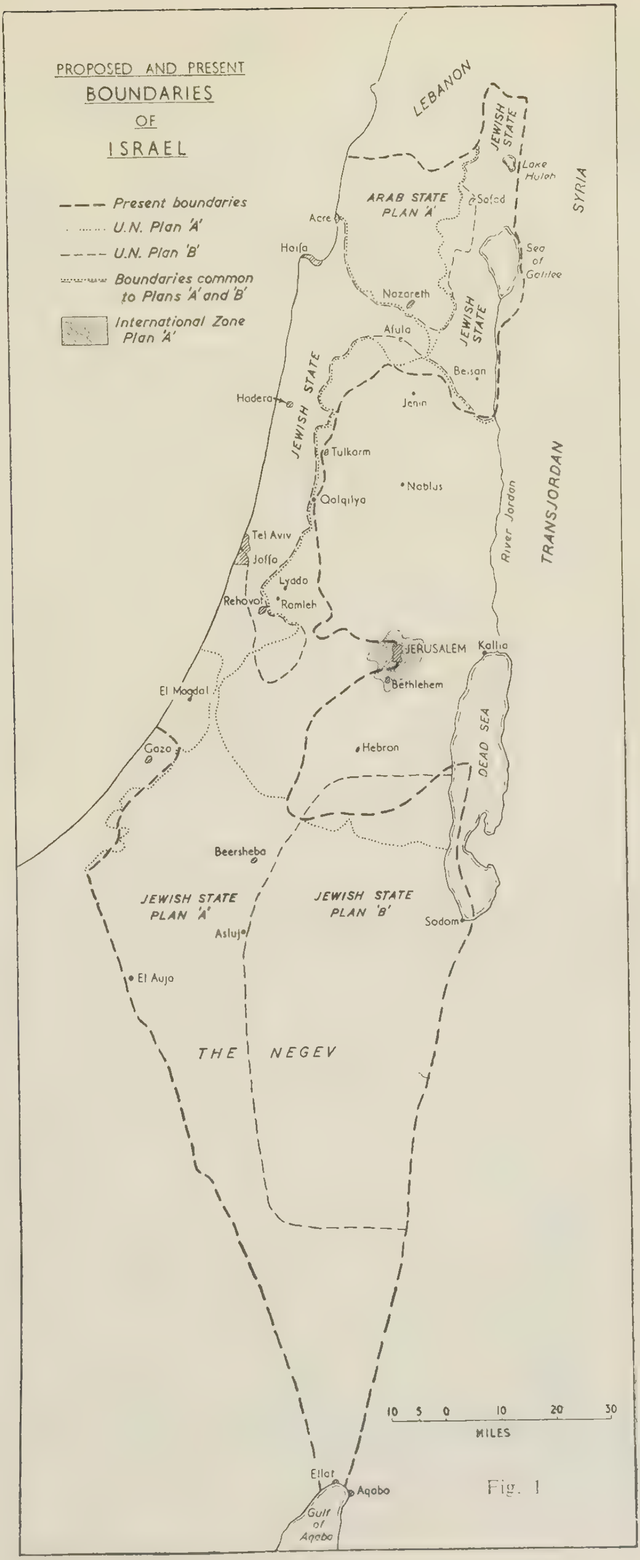
[3] *Government of Israel Year Book*, 1950, Jerusalem, 1950, p. 103. Unless otherwise quoted statistics are obtained from this source.

[4] See: *Palestine Partition Commission Report*, Chapter VI *passim*.

[5] The question of population transfer is discussed on pages 389–393, and the amount of cultivable land available for the resettlement of displaced Arabs in Chapter IX of the *Palestine Royal Commission Report*, 1937. Movements of population on the scale of recent events were clearly not envisaged.



PROPOSED AND PRESENT
BOUNDARIES
OF
ISRAEL
Present boundaries
U.N. Plan 'A'
U.N. Plan 'B'
Boundaries common to Plans 'A' and 'B'
International Zone Plan 'A'
LEBANON
SYRIA
JEWISH STATE
Lake Huleh
ARAB STATE PLAN 'A'
Safad
Acre
Haifa
Sea of Galilee
Nazareth
JEWISH STATE
Afula
JEWISH STATE
Beisan
Hadera
Jenin
Tulkarm
Nablus
Qalqilya
River Jordan
TRANSJORDAN
Tel Aviv
Jaffa
Lydda
Rehovot
Ramleh
JERUSALEM
Kallia
Bethlehem
El Magdal
Gaza
Hebron
DEAD SEA
Beersheba
JEWISH STATE PLAN 'A'
JEWISH STATE PLAN 'B'
Sodom
Asluj
El Auja
THE NEGEV
10 5 0 10 20 30
MILES
Eilat
Aqaba
Gulf of Aqaba

Fig. 1

The question of Jordan's access to the Mediterranean is an urgent one . since the population of the country. is treble that of Transjordan, and trade was mainly through Haifa in the past.

Population and Settlement

The area within Israel's present boundaries is approximately 8,050 square miles. The population of the Jewish State as proposed by the United Nations, would have consisted of some 655,000 Jews and 407,000 Arabs, assuming all Jews in the proposed International Zone for Jerusalem had crossed into Israel.[6] Now Israel controls almost all the area where Jews owned land or lived under the Mandate. only eight settlements being lost to the Arab states. The Arab population of the area now within Israel has been estimated as 859,000 before fighting began.[7] This includes an estimate for the bedouin of the Negev. The present Arab population of Israel is about 173,000, while Israel's total population passed 1,500,000 in December, 1951. Up to 31st December, 1951, some 685,000 Arabs had left Israel, and 690,000 immigrant Jews had replaced them. Jewish immigration since 15th May, 1948, has averaged over 16,000 a month. Most of the Arab population fled during the fighting before and immediately after the termination of the British Mandate. The present population density in Israel is thus about 190 persons per square mile, as compared with 184 for all Palestine in 1948. If the part of the Negev with less than eight inches of rain per year is omitted, the density rises to over 400 per square mile. The rate of natural increase of the population is high, and has actually increased since 1948.

Fig. 3 shows the movements of population up to the end of 1951. Table I shows the numbers of Jews coming into Israel since May, 1948, from the principal countries supplying immigrants, together with estimates of the numbers of Jews living in those countries in 1946. Up to December, 1951, almost half the immigrants were from North African and Middle East Countries, and it is now estimated that 39 per cent. of Israel's population is of oriental origin, using this term for the Jewish communities from Moslem and Asian countries. As the number of Jews in Central and East European countries diminishes, and there is as yet little sign of a large movement of immigrants from Western Europe, the British Dominions, and the U.S.A., the proportion of North African and Middle East Jews entering Israel is likely to increase still more. An outstanding feature of immigration in the early months of 1951 was the air lift of 120,000 Iraqi Jews. It is now estimated by Jewish authorities that the bulk of the Jewish population of the following countries have been transferred to Israel :—Germany, Austria, Czechoslovakia, Poland, Yugoslavia, Bulgaria, Iraq, the Yemen, Libya, and Cyprus. There are still large Jewish communities in Rumania and Hungary, and it is estimated that 450,000 remain in

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[6] *Report to the General Assembly by the United Nations Special Committee on Palestine*, p. 83 ; and *Government of Israel Year Book*, 1950, for the figure of Jewish inhabitants.

[7] *Final Report of the United Nations Economic Survey Mission for the Middle East*, Lake Success, 1949, part 1, p. 22.

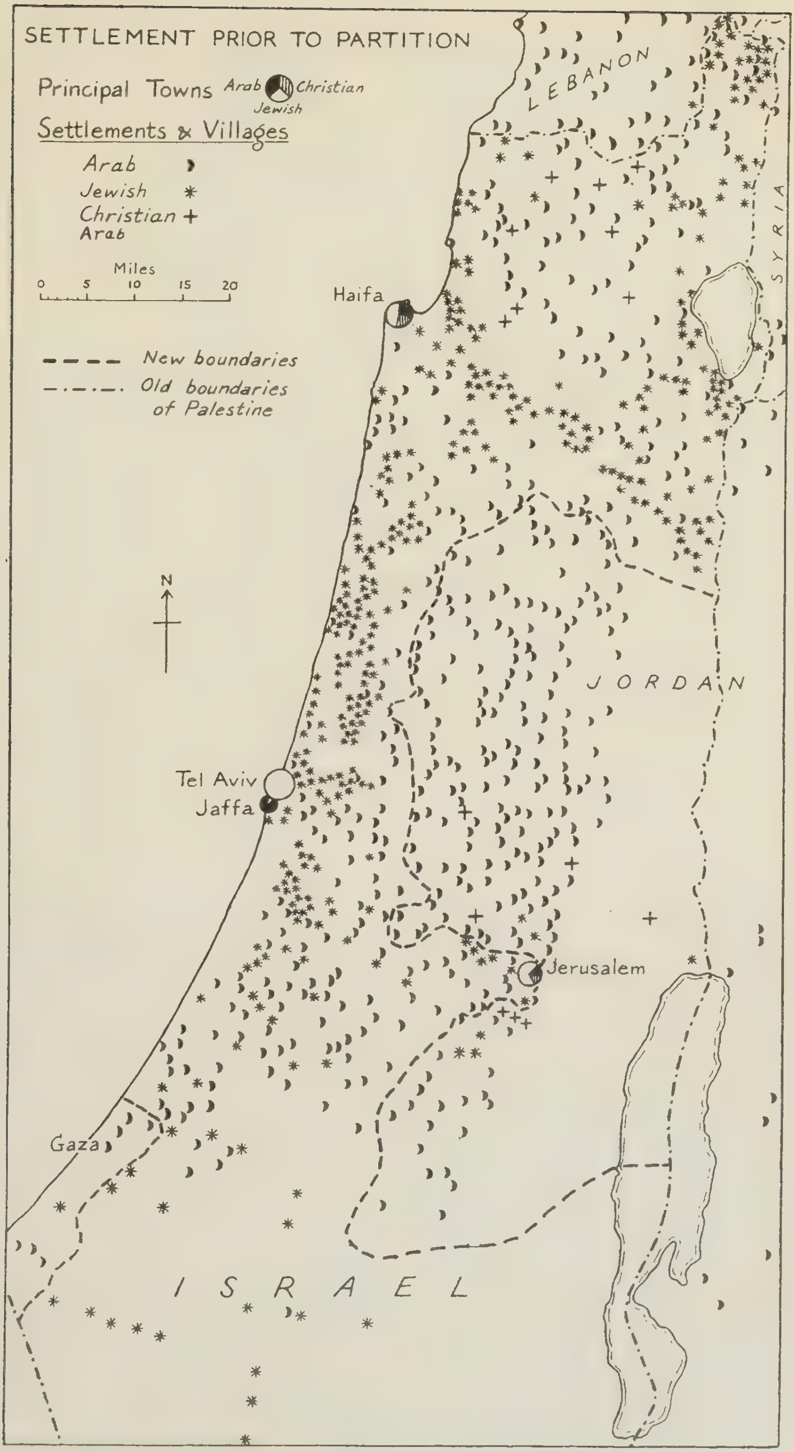
SETTLEMENT PRIOR TO PARTITION
Principal Towns Arab Christian
Jewish
Settlements & Villages
Arab
Jewish
Christian Arab
Miles
0 5 10 15 20
New boundaries
Old boundaries of Palestine
N
LEBANON
SYRIA
Haifa
JORDAN
Tel Aviv
Jaffa
Jerusalem
Gaza
ISRAEL

Fig. 2.

D

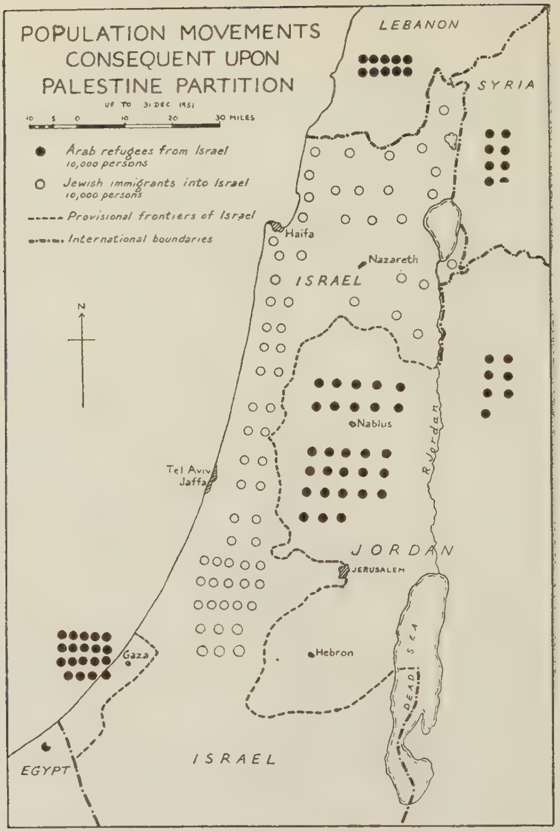

Fig. 3.

Eastern Europe, and 600,000 in Moslem countries, chiefly French North Africa, who will wish to move to Israel in the next five years. Jewish sources speak with some confidence of absorbing another 600,000 immigrants in the next three years.[8] In the rather unlikely event of the U.S.S.R. releasing in the near future some or all of the 2,100,000 Jews in that country a very serious strain on the absorptive capacity of Israel would result ; but in view of the policy of the Israel Government it would be difficult to refuse them entry.

In order to absorb some of these immigrants in agricultural employment, 241 new rural settlements had been established between May, 1948, and the end of 1950, and by the end of 1951 the number had risen to over 300. This compares with some 300 settlements of all types established by Jews in Palestine up to May, 1948. One hundred and two Arab villages remain in Arab occupation, most of them in Galilee. It is probable that in 1955 the rural population will be approximately half-a-million, out of a total population of 2 million. This is the proportion planned as economically and socially desirable. At the present moment only 17 per cent. of the population are directly

[8] E. Dobkin, "Basic Problems of Zionism," *Israel and Middle East*, Tel Aviv, vol. III, 1951, p. 57.

Fig. 4.

dependent upon agriculture for a living, which is contrary to many popular ideas on the subject of settlement by Jews in Palestine.

A map of the new settlements, established up to the end of 1950, shows several interesting features (Fig. 4). The concentrations in the Jerusalem Corridor and in Upper Galilee suggest that political and strategic motives are partly responsible, since this pattern establishes a good case against proposed boundary revision.[9] The coastal regions at the foot of the Carmel Range and north of Acre, formerly mainly Arab areas, have received a number of new settlements, but the largest number has been established in the country south of Tel Aviv and Lydda, in the plain of Philistia and the northern Shephelah, where previously Jewish settlement had been sparse, and from which most of the Arabs have fled. As yet there has been little settlement in the southern Shephelah and northern Negev, where mass settlement must await water development schemes. The new Negev villages are mainly in the north and west near Beersheba, in fact north of the 14 experimental settlements established between 1943 and 1948. When discussing the Negev it is important to note that the

[9] J. Weitz, "The Hills of Jerusalem," *Israel and Middle East*, vol. II, 1950, p. 147; and Levi Eshkol, "Mass Settlement in Israel," *Israel and Middle East*, vol. III, 1951, p. 10.

difference between the country receiving more than eight inches annual rainfall, and that receiving less, is such that it would be better if the term were reserved for the more arid part.

Jewish agricultural settlement in Palestine is popularly associated with the communal type of farm village, but since the new immigrants show a reluctance to enter this type of settlement a change in the social character of agricultural communities is occuring. The Moshav Ovdim, or co-operative smallholders settlement, and Moshava, the ordinary village settlement, outnumber the communal (Kibbutz) and collective farm (Moshav Shitufi) type of settlement by about two to one among the new foundations. In 1946 out of a total of 259 agricultural settlements of all types 111 were communal or collective, and the success of Jewish farming in Palestine is attributed by many authorities to the communal settlements of the young pioneers.[10] The very different background of the recent immigrants makes them reluctant to take up life in communal settlements, and the new settlements are rarely international in character.

The general pattern of population distribution in Israel is very similar to that of the Jewish population in Palestine in 1946.[11] There has been a considerable growth in the population of the towns, and population density in the triangle Tel Aviv–Petah Tiqva–Rehovoth is considerable. Former Arab towns such as Ramleh, Beersheba, Acre, and El Majdal now have large Jewish populations. In May, 1951, 42 per cent. of the total population lived in the three cities of Tel Aviv, Haifa, and Jerusalem. Tel Aviv itself contained no less than a quarter of the population of Israel. Otherwise the population changes follow the pattern of growth of the new agricultural settlements.

Population Pressure and Economic Development

A survey of the facts of area and population is of little value unless considered in relation to the geographical environment and economic trends. However, in view of past experience in Palestine and Israel, it is suggested that too much weight should not be attached to what is considered to be economic or practicable judged by standards elsewhere. This point is made in the report of the U.N. Economic Survey Mission for the Middle East which commented in 1949 :—" A cool examination of the relevant figures (and of the fact that certain crucial data are withheld) is apt to provoke wonderment at the magnitude of the task Israel's government has set herself. But there are forces which cannot be measured in figures, and these forces sometimes decide events in apparent defiance of reason."[12] After studying developments in Israel a geographer is apt to ask whether faith can be considered as a ' geographical factor ' ?

Although only 17 per cent. of the population are employed in

[10] *A Survey of Palestine*, 2 vols., Government Printer, Jerusalem, vol. I, 1946, p. 378.

[11] See : Map No. 3 in *Collection of Maps Relating to the Report of the Anglo-American Committee of Enquiry*, Supplement to Cmd. 6808, H.M.S.O., 1946.

[12] *Final Report of the U.N. Economic Survey Mission for the Middle East*, part I, p. 55.

agriculture, the largest single export by value is still citrus fruit (36 per cent. by value in 1951), and it is planned to make the country self-balancing in food stuffs by paying for imported grain and meat with exports of fruit. It should be possible to make the country self-sufficient in vegetables and dairy produce. However, in 1951 the value of imported food was four times the value of food exports.[13]

Cultivable Land

Israel has obtained virtually all the land classed as ' good quality ' on the land classification map prepared by the Research Staff of the Anglo-American Committee of Enquiry on Palestine in 1946. This map took into account most of the essential characteristics of Palestine soils.[14] In the northern Negev there is a large area where the deep loess soil is known to yield well under irrigation, and where, in years of good rainfall, the Arabs grew many dry-farmed crops. In the southern Negev, prospects are very uncertain without irrigation ; and intensive research into soil quality and water prospects is taking place.

In the Galilee and Judean hill country, the steep limestone slopes require terracing for cultivation, and much of the thin *terra rossa* soil has been eroded away in the past. Few Jewish settlements were established here under the Mandate, although some experimental farms had sought to determine the most suitable types and methods of farming. To-day the opinion is that an average subsistence holding in the hill country should be about four to five acres in extent, but that with intensive fruit farming it could be much less. In 1938 a Jewish estimate of the minimum acreage for a fruit farm in the Galilee hills was 10 acres, so that this new estimate leaves almost no margin for error. It is now planned to settle some 46,000 persons in 115 villages, on an area of about 112,000 acres in the Jerusalem corridor. It is proposed to afforest some 50,000 acres of this, as it is thought to be too steep and rocky for cultivation.[15] The result would be that the average area of cultivable land per settlement of 400 persons would be about 540 acres. This suggests that the limited amount of land available in Israel is to be utilised in such a way that there is little scope for an increasing population in the future.

In the Galilee hill country there are some hundred thousand Arabs already, who are mainly agriculturalists, so that there is not much opportunity for further Jewish settlement here ; for if a 1938 estimate of cultivable land is accurate, Upper Galilee could support few more cultivators, even at the density proposed for the Jerusalem Corridor.[16]

In the Plain of Beisan, the Vales of Jezreel and Esdraelon, and the Huleh swamps, close settlement awaits further irrigation developments ; swamp clearance in the latter area is now nearly complete. The Huleh reclamation scheme should bring under cultivation some

[13] *News Digest*, Jewish Agency, 5th Mar., 1952.
[14] *Op. cit.*, Map No. 5.
[15] J. Weitz, *op. cit.*
[16] *Palestine Partition Commission Report*, *op. cit*, p. 68.

15,000 acres of land, and save for irrigation about 3,500 million cubic feet of Jordan water which now evaporates annually. In 1946 only about 10 per cent. of the cultivated Jewish land in the Esdraelon area was under irrigation.

So far the increase in land brought under irrigation and crop area in Israel has not kept pace with the rise of population since 1948 ; but in view of the mass immigration this is not surprising.[17] In 1950 the area under irrigation was only some 75,000 acres, but it is claimed that vegetable production doubled between 1948 and 1950, and the number of poultry also doubled. The total area under field crops in 1951 was about one-third of that for all Palestine in 1945 ; but the yield on much of this land would be higher than that on Arab land in 1945. At present the most serious food deficiencies in Israel are wheat, of which 80 per cent. was imported in 1950, and meat, and the food ration is a very strict one and leaves little available for free purchase.

Water Resources and Irrigation

The water resources of Palestine have in the past been the subject of much controversy ; but as yet in spite of optimistic general statements there seems little to indicate that formerly official estimates were unduly conservative in Palestine. Some supplies of sweet water have been struck in bores made at Elath on the Gulf of Aqaba, but most of the Negev is admitted to be *terra incognita* as far as water supply is concerned. There is a need for a sense of proportion when discussing discoveries of subsoil water in desert regions, and the whole question is very susceptible to propaganda. More water is being drawn from wells in the northwestern Negev. A reliable estimate of the sub-surface water available in the northern Negev in 1947 showed that if it could all be utilised an additional 36,000 acres of land might be irrigated.[18] However, much of this water is saline, and experiments have been conducted in Negev settlements to dilute salt water with sweet water in usable proportions.

As a result of the acquisition of deep drilling machinery, more water is now being drawn from the main limestone formations in the Judean hills, and in the coastal plain to the west, where the hill formations sink beneath the Pliocene-Pleistocene rocks which are floored by the impermeable ' Saqia ' beds.

If the accuracy of the figures quoted by Dr. Willatts[19] is accepted for the subsoil and runoff water available on the western side of the hill country of Palestine, then perhaps another 225,000 acres could be irrigated in the maritime plain. Thus, together with known water supplies in the Negev, and assuming that three-quarters of all the water in the main limestone formations can be used, the maximum

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[17] D.B. in " Israel To-day," *The World To-day*, vol. VI, 1950, p. 505, gives a similar view and statistics.

[18] G. S. Blake and M. J. Goldschmidt, *Geology and Water Resources of Palestine*, Jerusalem, 1947, pp. 339–412.

[19] E. C. Willatts, " Some Geographical Factors in the Palestine Problem," *Geographical Journal*, vol. CVIII, 1946, pp. 146–179.

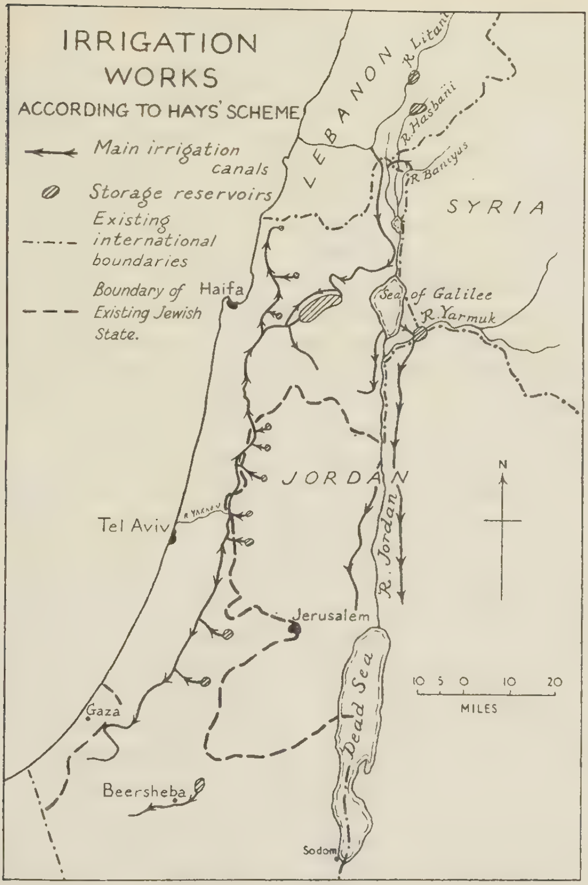

Fig. 5.

additional irrigable area in Israel might be 300,000 acres, without drawing on Jordan or Yarmuk water. This does not take into account the evaporation losses, engineering problems, or economic considerations, since problems in Israel are usually discussed without reference to difficulties. Afforestation and conservation measures, now actively in hand, might actually increase the water available.

Irrigation schemes in hand at the moment suggest that water in quantity has not yet been discovered in the Negev.[20] It is planned to send water to the Negev from the small Yarkon river, north of Tel Aviv, by means of two large pipe lines. These pipe lines will link up with local well irrigation schemes and the easternmost of the two pipes will supply settlements in the Jerusalem Corridor. Local well and spring sources in various parts of the country will distribute all water in pipes, and this should ensure that there is little wastage. It is estimated that the Yarkon scheme will eventually irrigate 62,000 acres of land, but this will require a dam and storage reservoir to hold up flood water, and diversions from tributary wadis. The

[20] P. H. Doron, "Irrigation Blueprint for Israel," *Israel and Middle East*, vol. II, 1950, pp. 93–96.

Palestine Government estimated that the Yarkon river could irrigate 15,000 acres.[21] Part of the much publicised Hays Savage scheme proposed to store water in all the wadis draining to the Mediterranean. However, now most of the suitable dam sites are in Jordan, little of this part of the scheme could be carried out. This plan estimated that all the wadis between Haifa and Beersheba would yield as much water as it is now claimed the Yarkon can provide.[22] If these estimates are sound, then the importance of the wider aspects of the Hays scheme, and its urgency, are apparent, since the additional irrigable acreage might support another 200,000 agricultural workers and their dependants. This figure is likely to be reached when Israel receives its millionth immigrant, probably in late 1953 or early 1954.

The chief features of the Hays scheme are illustrated in Fig. 5. It demands diversion of the Jordan, Yarmuk, Hasbani, and Litani rivers to bring water to the maritime plain and the Negev. This is apparently still planned, subject to agreements with Jordan, Syria, and the Lebanon. It is possible for Israel to take off water now from the Jordan above Lake Huleh, and to send it by gravity flow canal to the Vale of Esdraelon and farther south, but this would affect the levels of Lake Tiberias, the Jordan and the Dead Sea. Jordan is also planning to use the same water to irrigate land in the lower Jordan valley.[23] It is suggested that a diversion of the Litani waters might profit Lebanon, by flood control works on the Litani, power station construction, and an increase in the amount of water available for irrigation within Lebanon. The estimate in the Hays scheme suggested that the whole project would irrigate another 400,000 acres in what is now Israel. At the moment the most striking feature of these schemes is their political implications, and consequent impracticability. The sooner some solution which divides the share of Jordan water between Israel and Jordan is reached the better for both countries.

Industrial Development

With no domestic coal supplies, few metallic minerals, and none worked as yet, no oil, and poor opportunities for hydro-electric power (unless the full Hays scheme is implemented and Mediterranean water is dropped by tunnel into the Jordan valley) the prospects for industrial development seem poor. However, Israel can rely on an industrious and, in part, highly skilled population, to whom the wage incentives and pioneer spirit found in the country are a great stimulus. She will have to rely on low relative costs, marketing skill, and a variety of low weight, high cost articles if industrial production is to make any great contribution to the present desperately ill-balanced export-import ratio. Remarkable progress has been made so far in developing industry in the country. A car assembly plant and a small steel works have been established in Haifa Bay. There are numerous textile factories, and recent constructions include a shoe factory at

[21] *A Survey of Palestine*, vol. I, p. 421.

[22] Unpublished non-technical Summary of *Preliminary Report on Irrigation and Power Possibilities in Palestine*, by James B. Hays, Jewish Agency.

[23] M. G. Ionides in *The Times*, 2nd Aug., 1951.

Jerusalem, motor tyre plants at Petah Tiqva and Hadera, a plastics factory at Acre, and a large chemical works at Haifa. However, older Jewish industries, established before and during the last war, such as diamond cutting and polishing, the manufacture of spectacles, false teeth, chocolate and textiles are those most successful in exporting. In 1951, diamonds amounted to 27 per cent. by value of exports.[24] Unless more raw materials can be produced in the country, the industry of Israel will rest on very insecure foundations as it is highly susceptible to world economic conditions. There are signs of iron ore, manganese and copper in the Negev, while potash from the Dead Sea, phosphates from the Negev, and peat in the Huleh are at present available in quantity. There is still a possibility that mineral oil may be discovered in the country, and if the Arab states would call off their economic blockade the Haifa refinery would be a most valuable asset, particularly with the completion of the last 40 miles of the new 16-inch pipeline from Kirkuk, which has been held up since 1948.

Conclusion

While the most significant fact emerging from a study of Israel's present boundary and population problems may be that political considerations have so far been of paramount importance in shaping the state's extent, racial and social composition, and economic geography, it is suggested that a close study of the human geography of the country affords some useful object lessons in principles, and its future development should be a matter of great interest to geographers as well as to economists and statesmen.

TABLE I

Country of Birth of Immigrants to Israel since 15th May, 1948, and estimated Jewish Population of those countries in 1946.

Country (Principal sources only)	Number of immigrants to nearest thousand 15/5/48–31/12/51	Jewish Population 1946 estimate
U.S.S.R.	5,000	2,655,000†
Rumania	118,000	335,000
Poland	106,000	80,000*
Bulgaria	37,000	45,000
Hungary	15,000	200,000
Czechoslovakia	19,000	65,000
Germany and Austria	11,000	109,000†
Yugoslavia	8,000	11,000
U.K.	2,000	365,000†
All other European Countries	10,000	364,000†
Iraq	125,000	120,000
Yemen	45,000	50,000
Turkey	35,000	50,000
Persia	23,000	100,000
Syria and Lebanon	3,000	36,000
Egypt	15,000	75,000
Libya	32,000	35,000
French North Africa	50,000	444,000

Grand total of all immigrants to Israel, 15/5/48–31/12/51 : 690,000.
Of which, Jews from Middle East and North African Countries number : 328,000.

*Many of the Jews born in Poland were actually in D.P. camps in 1946.

† Includes refugee and displaced Jews.

[24] For recent statistics of foreign trade and a survey of economic development see : Sir C. Skrine, "Economic Development in Israel," *Geographical Journal*, vol. CXVIII, 1951, p. 324.

THE ORIGINS AND EARLY GROWTH OF BRISBANE, QUEENSLAND

L. J. Jay*

An obelisk which stands unobtrusively on the north bank of the Brisbane river near to Grey Street bridge, informs the observant passer-by that " Here John Oxley, landing to look for water, discovered the site of this city, 28 September 1824." Settlement followed closely upon this discovery, but the origins of Brisbane antedate Oxley's landing by more than half a century, and are linked by a tenuous thread of circumstance with the celebrated voyage of Lieut. James Cook in the *Endeavour*.

The Discovery of the Brisbane River

After his historic landing in Botany Bay on 29th April, 1770, Cook steered a northerly course along the eastern coastline of Australia, charting promontories and inlets observed from his ship, yet landing only when driven by necessity to seek fresh water or a safe anchorage for repair. He reached the latitude of Brisbane on 17th May 1770, and named Point Lookout, Cape Morton and Morton's Bay. In reality these were not indentations of the mainland, but features on the seaward side of two islands which partially conceal the true Bay (Fig. 1a). It is, therefore, remarkable that some on board the *Endeavour* suspected the presence of a large river emptying into the bay. Cook would not commit himself to an opinion, but was content to leave the matter for subsequent investigation by others.[1] Observing that the place could readily be located by the prominent peaks to northward which he named the Glass Houses, Cook continued on his northerly course without landing.

The British settlement of Australia began in 1788 when the First Fleet commanded by Capt. Arthur Phillip reached Botany Bay. Six years later John Hunter left England to succeed Phillip as Governor of New South Wales, and with him went George Bass and Matthew Flinders, two men destined to perform notable voyages of discovery in Australian waters. In 1798 Bass and Flinders established the insularity of Van Diemen's Land. Six months later the indefatigable Flinders set off again in the sloop *Norfolk*, having been granted six weeks leave of absence by Governor Hunter. He proposed to explore Glasshouse and Hervey's Bays, two inlets north of Sydney, hoping to find a river discharging into one of them which might afford a means of penetrating the interior.[2]

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* Mr. L. J. Jay is assistant geography master at the Grammar School, Wellingborough. During his war service with the Royal Navy he was for about a year stationed in Brisbane, and during that time gathered material for a geographical study of its growth.

[1] W. J. L. Wharton, (ed.) *Captain Cook's Journal*, London, 1893, p. 254 ; also J. Hooker (ed.), *Journal of the Rt. Hon. Sir Joseph Banks*, London, 1896, p. 270.

[2] Matthew Flinders, *A Voyage to Terra 'Australis*, 1801–3, London, 1814, vol. i, p. 193.

At noon on July 14th, 1799 he lay off Point Lookout and could see the narrow entrance into Moreton Bay.[3] Two days later, seeking a place to lay up his ship for repairs, he landed by boat on what is now called Bribie Island. Following an unfriendly encounter with a party of natives he named the place Point Skirmish (Fig. 1b). During the next few days he sailed the *Norfolk* around the modern Moreton Bay; he named Redcliff Point but passed the mouth of the Brisbane river without observing it. We may surmise that numerous shoals and sandbanks kept the sloop at a respectful distance from the mangroves which concealed the inner shores of the bay. He returned to Point Skirmish and made an overland trip to the Glass House mountains before sailing northward for Hervey's Bay on July 31st.

Matthew Flinders was the first navigator known to have entered Moreton Bay after Cook had charted its outer limits, but although he proved the insularity of Cape Moreton he was unable to make a close survey of the bay's western shores in the brief space of time allotted to him for the expedition. Indirectly, however, Flinders subsequently made a substantial contribution to the discovery of the Brisbane river, for when he sailed around Australia in the *Investigator* in 1802–3, being the first man to circumnavigate that continent, he discovered and charted the harbour of Port Curtis on the coast of Queensland near the tropic. Capt. Cook had sailed past this inlet during the night, and was not therefore aware of its existence, but Flinders reported favourably on the place as a harbour and as a possible area for future settlement. Twenty years later John Oxley—who had been appointed Surveyor-General of New South Wales on the recommendation of Capt. Matthew Flinders—was sent northward from Sydney to survey the Port Curtis and Moreton Bay areas, and it was Oxley who established the site of Brisbane on the river of the same name.

The years between had witnessed the transformation of the gaol at Sydney into a flourishing township with many fine buildings, a thriving wool industry, and road communication with the interior. With the increasing emigration of free settlers to New South Wales there soon arose the need to segregate the worst of the convicts in gaols as remote as possible from Sydney. Port Macquarie, at the mouth of the Hastings river some 160 miles north of Port Jackson, had been discovered by Oxley in 1818, and a penal establishment was planted there three years later, but the rapidity with which it was filled had prompted Governor Brisbane to send the Surveyor-General northwards in the cutter *Mermaid* to explore the Port Curtis and Moreton Bay areas; his intention was to form a convict settlement at one of these places in order to relieve the overcrowding of the gaols at Sydney and Port Macquarie.

Oxley was not impressed with the possibilities of settlement at

[3] The journal of Cook's voyage in the "Endeavour" was published in 1773 by John Hawkesworth as one of several expeditions which had recently been made to the southern hemisphere. The editorship was not of a high standard and Hawkesworth must be held responsible, *inter alia*, for the change in spelling of Morton's Bay to Moreton Bay.

Port Curtis, and he therefore turned south to examine Moreton Bay. He rounded Point Skirmish on 29th November, 1823, and dropped anchor in almost the same spot where Flinders had anchored the *Norfolk* twenty-four years previously. Oxley was more fortunate than Flinders in his first encounter with the Moreton Bay blacks, for among the natives assembled on the shore was an Englishman who had left Sydney in a small boat eight months before, and with two companions had been shipwrecked on Moreton Island.

On December 1st Oxley began his exploration of the western shores of the bay, a task rendered easier by the information which the rescued men were able to provide. He ascended the river in a rowing boat for about 42 miles, naming Termination Hill on the south bank near the limit of his exploration (Fig. 1c).

The favourable report which Oxley submitted, concerning the possibility of establishing a convict settlement on the banks of the Brisbane river was the reason for his second visit to Moreton Bay.[4] On 10th September, 1824 he entered the Bay in the brig *Amity*, accompanied on this occasion by Lieut. H. Miller who commanded a detachment of soldiers guarding 30 convicts. Whilst Lieut. Miller surveyed the land around Redcliff Point with a view to making a provisional base there, Oxley renewed his exploration of the Brisbane river. He ascended it for about 14 miles beyond Termination Hill, returned to Redcliff Point on September 29th to advise Lieut. Miller of the site he had chosen for a permanent settlement, and sailed for Sydney eleven days later.

In the report of his first visit to Moreton Bay in 1823, Oxley had emphasised that although an initial depot at Redcliff Point might be necessary, a more suitable place for a permanent establishment lay on the western bank of the Brisbane river at the head of the Sea Reach. (Where Enoggera Creek joins the main stream ; see Fig. 3). A year later, Oxley encamped for a night on this spot when he resumed his exploration of the river, but his journal recorded that the natives were troublesome and tried to steal some of his equipment. This apparently prejudiced him against the place, for on September 28th as he proceeded downstream on the return leg of his river trip he landed in search of fresh water and discovered " a chain of ponds watering a fine valley . . . by no means an ineligible station for a first settlement up the river."[5] In these words Oxley described the site of the future capital of Queensland, but he was more enigmatic concerning the reasons underlying his revised choice, for his journal reveals a startling absence of entries from 29th September to 7th October, 1824. It is curious that so much speculation surrounds the circumstances

[4] The report and chart of Oxley's 1823 Expedition to Moreton Bay appeared in *Geographical Memoirs on New South Wales, etc.*, Barron Field (ed.), London, 1825. See also Nicholas Lockyer, " John Oxley's Missing Journal of 1823," *Journal of the Historical Society, Queensland*, vol. ii, Brisbane, 1920.

[5] Sir Hugh M. Nelson, " The Discovery of the Brisbane River," *Proc. Roy. Geog. Soc. Australia, Queensland*, vol. xv, Brisbane, 1900 ; also " Extracts from the Field Books of John Oxley," *Journal Hist. Soc. Queensland*, vol. ii, Brisbane, 1925, pp. 137–156.

attending the selection of the site, and it is to be regretted that no other contemporary evidence has yet come to light which would elucidate these eight vital days in the genesis of Brisbane.[6]

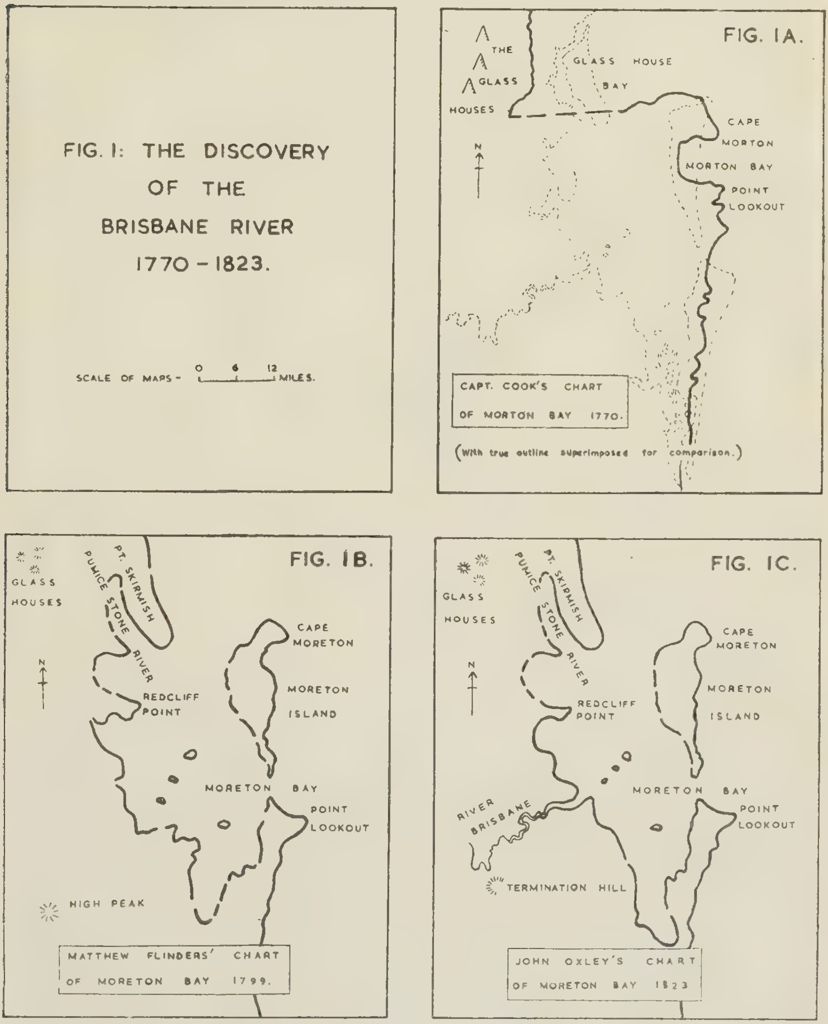


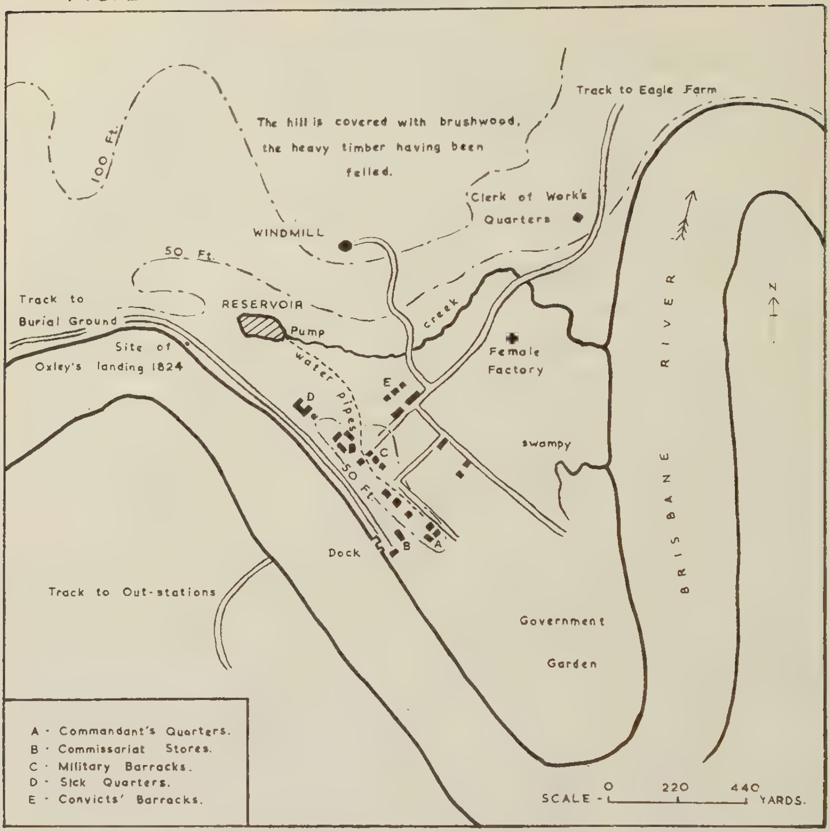
FIG. I: THE DISCOVERY OF THE BRISBANE RIVER 1770 - 1823.

The Penal Settlement at Moreton Bay

For 35 years after the establishment of a gaol upon the north bank of the Brisbane river on the site chosen by Oxley, the " Moreton Bay Settlement " formed the most northerly province of New South Wales. Not before 1859 was the region north of the Macpherson Range permitted to assume the status of a separate colony and free itself from the fetters of the governing body at Sydney.

[6] This topic has been treated at greater length by the present writer in a paper entitled " The Selection of the Site of Brisbane in 1824 " which was read at a meeting of the Historical Society of Queensland on May 25th, 1950.

FIG. 2: THE PENAL SETTLEMENT AT BRISBANE.



Until 1842 Brisbane town was substantially no more than the administrative centre of a penal establishment, harbouring the more objectionable class of convict in Australia, and owing its location largely to the remoteness of its site from the main centre of population. During these 18 years Brisbane was a small, self-contained community at the terminus of a 580-mile sea voyage from Sydney which Government supply vessels covered at periodic intervals. The town scarcely exercised its function as a port concerned with the transfer of goods to and from its hinterland, for politically the hinterland did not exist ; a Government decree forbade anyone to approach within 50 miles of Brisbane without permission, an order which was strictly enforced until 1842.[7] Contemporary sources of information are regrettably few and scattered, but from the scanty evidence extant it would appear that so long as Brisbane remained a convict settlement its geographical potentialities as a port serving a productive hinterland were either overlooked or deliberately stifled by authorities at Sydney.

Brisbane is encompassed on the landward side by a semi-circle of

[7] It is difficult to ascertain when this decree was promulgated. Histories of Queensland and contemporary newspaper articles imply that the ban operated throughout the period of the Penal Settlement but fail to quote authorities.

mountains, reaching heights of 2,000 ft. above sea-level on the north and north-west, and rising to peaks above 4,000 ft. on the south and south-west. About 80 miles to westward of the town the watershed of the Moreton Bay drainage coincides with the Great Dividing Range, dropping away steeply on its eastern flanks but inclined more gently towards the interior where the Condamine and its tributaries flow across the Darling Downs to join the Darling river. Within the encircling rim of ranges thus described, most of the area drains into the Brisbane river and is below 600 ft. in height, but coastal ranges of greater elevation converge on Brisbane from the north and south to create subsidiary drainage systems into the bay which are independent of the Brisbane river, and endow Brisbane with certain characteristics of a gap-town (Fig. 4).

This physical setting had been explored and mapped in essentials before 1830 by the efforts of a few pioneers. Major Edmund Lockyer in 1825 ascended the Brisbane river to its headwaters, discovered the Stanley river, a powerful left-bank tributary, and traced for a considerable distance the creek which now bears his name. Capt. Patrick Logan, Commandant of the settlement from 1825–1830, carried out a number of valuable surveys during his tenure of office in the southern part of the region between Brisbane and the Macpherson Range. But it was Allan Cunningham—a botanist, not a soldier—who effectively related the drainage basin of the Brisbane river to the land west of the Dividing Range. In 1827 he covered the unknown country lying west of the range between the Hunter river and Moreton Bay ; after crossing and naming several important rivers flowing westwards to the interior he came upon the rich pastures of black soil which he named the Darling Downs. He halted at the western foot of the Dividing Range, unable to discern a way through, but in the following year he started from Brisbane and succeeded in his quest.[8] His route—since known as Cunningham's Gap—lay 60 miles south-west of Brisbane (Fig. 4).

The pattern of buildings upon the site selected by Oxley took shape between 1825 and 1830, and the restricted nature of the urban functions which the township was permitted to exercise during the ensuing dozen years is aptly illustrated in the plan of Brisbane, drawn up in 1839 and signed by Major Barney (Fig. 2). Even at that date the town had but one purpose—to regulate the life and work of the convicts, and to house them, the Commandant, and his staff. The chief cluster of buildings occupied rising ground between the chain of ponds and the river-bank within one of the numerous meanders of the lower Brisbane, water being piped from the old reservoir or surface tank on the site of what is to-day Tank Street. From the Prisoners' Barracks a winding path led northward up a steep slope to the windmill, erected in 1829 and used as a treadmill by the prisoners.[9] A second track,

[8] Ida Lee, *Early Explorers in Australia*, London, 1925, chaps. xvii–xix.

[9] This windmill on Wickham Terrace and the walls of the Commissariat Stores in William Street are the only buildings in Brisbane to-day which date from the convict period.

the forerunner of the modern Queen Street, wound north-eastwards to the Eagle Farm establishment down river, passing the Female Factory (on the site of the modern G.P.O.) and crossing the stream at the hollow which is to-day the intersection of Queen and Creek Streets.

Details of the population of Brisbane throughout its convict days are difficult to obtain, but it would appear likely that the numbers fluctuated according to the accommodation at other penal establishments such as Port Macquarie and Norfolk Island, and were influenced in some measure by the vicissitudes of governing policy emanating from Sydney. There was no true growth of population in the sense of a group reproducing itself. The number of convicts exceeded 1,000 in 1831 and thereafter decreased irregularly until there were only 320 in 1837.[10] If to these numbers are added about 100 for the military personnel one obtains a fair estimate of the fluctuating population of Brisbane during its convict days.

Apparently little attempt was made to employ convict labour for constructive public works or agricultural development beyond the needs of subsistence. Barney's map suggests that all the buildings were strictly utilitarian, and the amount of cultivation was small ; wheat, maize and potatoes were the leading crops.[11] Apart from Crown prisoners the chief cargoes shipped from Brisbane to Sydney were bushels of maize and specimens of Moreton Bay timbers, the latter in the form of shingles, tulip-wood logs, cedar planks, and walking-sticks.[12]

The economic stagnation within the Moreton Bay Settlement contrasted sharply with the vigorous exploration and pastoral development which characterised the hinterland of its parent city, Sydney, during these years. It was a period of conflict between the policy of the British Government and the desires of the Australian settlers. The Government hoped to confine settlement within definite limits, feeling that such a concentration was conducive to the best development of Australian resources, and to the furtherance of that policy in 1829 Governor Darling defined the Nineteen Settled Counties which extended around Sydney for a radius of about 150 miles and beyond which no one might lawfully settle. But the insistent demands of English manufacturers for more wool proved an irresistible temptation to the Australian stockmen, who met these demands by driving their flocks wherever the grass was good, along the tracks of the explorers, westward, southward and northward, beyond the limits of location. They " squatted " on land to which they had no legal right, and such was the lure of " new land further out " that in 1836 nearly a million sheep

[10] " Monthly Returns of Convicts at Moreton Bay." Manuscript volume in the Oxley Memorial Library, Brisbane. The returns cover the period from September 1829 to April 1837.

[11] Manuscript in Oxley Library, Brisbane (no title), section headed " Monthly Returns of Land under Cultivation at Moreton Bay." The entries relate to the period from September 1829 to October 1836.

[12] *Ibid.* " Manifest of the Cargo and Number of Passengers shipped on Board." (Movemeint of ships from Moreton Bay, February 1833 to May 1837).

were grazing on forbidden land.[13] By this year the overlanders moving southward from Sydney had reached the sea at Port Phillip; due west the pastures deteriorated to the dry salt-bush of the Darling river. Hence from about this time onward the wave of squatters and their stock surged northwards in the direction of Cunningham's Darling Downs. In January, 1840, John Campbell squatted with his cattle on the northern banks of the Dumaresq or Severn river, and thus laid claim to be the first stockman established in Queensland. Two months later Patrick Leslie passed Campbell's station on his way out along Cunningham's track, and founded at Toolburra the first station on the Darling Downs.[14]

Meanwhile, officialdom in Sydney continued to regard with disfavour the penal settlement at Moreton Bay. Sir Richard Bourke, Governor of New South Wales from 1831 to 1837, was no more agreeably disposed towards Brisbane than his predecessor, Darling, and he prepared for its gradual abandonment as a gaol. (It was probably no mere coincidence that, so far as can be ascertained, the number of convicts at Brisbane declined rapidly from the year that Bourke became Governor). Official prejudice thus combined with the northward surge of the squatters to close the penal settlement at Brisbane, and the town ceased to receive convicts after 1839.

The Port for the Darling Downs

Three years elapsed before Brisbane was opened to free settlers;[15] during this time the Government ban on approaching within 50 miles of the town was rigidly enforced, and until 1842 no vessel could touch at Brisbane without previously having obtained permission from the Governor of New South Wales at Sydney.[16] Buildings and cultivated plots were neglected, and when Governor Gipps visited the town in 1842 he noted the new growth of brushwood on land which had been cleared for cultivation. He reported to Lord Stanley that about 45 sheep and cattle stations had been established "in the districts behind and beyond Moreton Bay" (i.e. east and west respectively of the Dividing Range), but that none had been permitted within 50 miles of the town. About 1,800 bales of wool from these stations were shipped from Brisbane during 1842.[17] Thus even before the penal settlement had been officially closed, Brisbane was assuming its natural function as the port for a wide hinterland which reached across the Dividing Range. In the years between the opening of the Moreton District to free settlement in 1842 and the creation of a separate colony

[13] S. H. Roberts, *History of Australian Land Settlement*, 1788–1920, Melbourne, 1924, part iii. See also *Cambridge History of the British Empire*, vol. vii, part i—"Australia," London, 1933, chap. vii.

[14] Patrick Leslie's Diary is quoted in H. S. Russell, *The Genesis of Queensland*, Sydney, 1888, pp. 164–171.

[15] Although a group of Lutheran missionaries from Germany had been permitted to settle at Kedron Brook, about 7 miles northeast of the town, in 1838. *Vide* H. J. J. Sparks, *Queensland's First Free Settlement*, Brisbane, 1938.

[16] *New South Wales Government Gazette*, Sydney, 11th February, 1842, p. 249.

[17] Gipps to Lord Stanley, May 4th, 1842, *Historical Records of Australia*, Series I, vol. 22, Sydney, 1924, p. 35.

of Queensland in 1859, the growth of Brisbane was largely conditioned by the economic ties which bound it to the Darling Downs.

The resignation of the last Military Commandant at Brisbane in 1842 and the transfer of his authority to representatives of the civil Government was the signal for a wave of enthusiastic town and country planning. Official proclamations defined two new Pastoral Districts of New South Wales, to be known as the Moreton and Darling Downs Districts respectively; the former of these approximated closely to the area draining into Moreton Bay (Fig. 4), and during the next few years it was subdivided into five counties by the Surveyor-General, Sir Thomas Mitchell. At the same time sales of town land on both banks of the river were held and the prices which were realised "exceeded the most sanguine expectations." The township was surveyed and in the loop of the river which had been occupied by the buildings of the penal settlement a network of new streets intersecting at right angles was projected (Fig. 3). The boundaries of Brisbane town, gazetted in 1846, formed a roughly rectangular pattern following the cardinal points of the magnetic compass. This outline can readily be detected in the present-day street plan, with Boundary Street, Vulture Street, Wellington Road and a second Boundary Street coinciding respectively with the north, south, east and west limits of the town in 1846.

Patrick Leslie was quickly followed by many other squatters who occupied the creeks draining the western slopes of the Great Dividing Range, and even before 1842 a number of stockmen had moved from the Darling Downs across the range eastward on to the pastures of the Moreton region. By 1845 there were 31 stations in the Moreton District and 23 on the Darling Downs.[18] New routes across the Dividing Range to the coast, more direct and easier of access than Cunningham's Gap, were developed about this time (see Fig. 4), and it would seem that stockmen quickly appreciated the contrasted geographical conditions for pastoral farming which obtained west and east of the Dividing Range, for an observer in 1845 recorded that in the Moreton District (where the annual rainfall varies from 30 to over 70 inches), much of the land was too low-lying, too rich and too damp for sheep, whereas on the Darling Downs (with under 30 inches of rain per year) most of the stations were primarily concerned with sheep-rearing. From the same source one learns that the exports from Brisbane to Sydney in 1844 were beef, hides, wool, tallow, sheep skins and pine boards.[19]

The search of the squatters for a satisfactory road across the Dividing Range to convey the produce of the Darling Downs to the coast was paralleled on the eastern margins of the Moreton District by the demand for a suitable port. For many years after 1842 wool brought from the Downs by drays was transferred to river-steamer at

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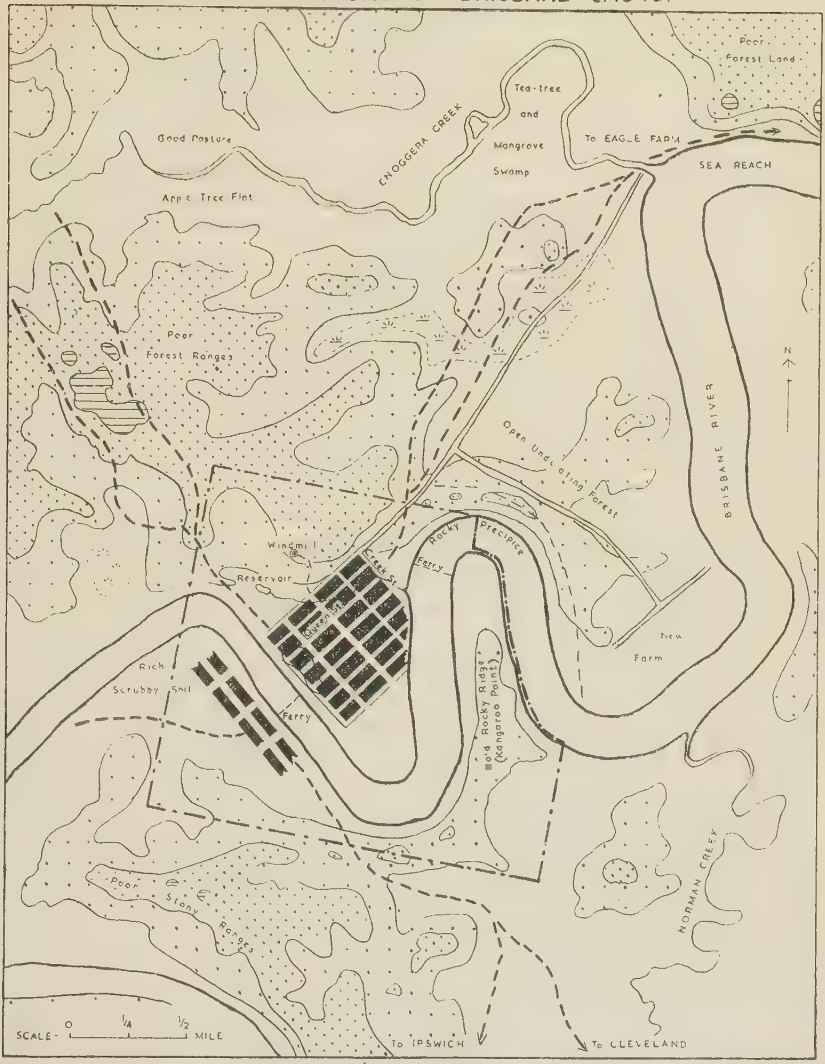
[18] "List of Persons who have obtained Licences to depasture stock beyond the Limits of Location," *N.S.W. Government Gazette*, Sydney, 18th Nov., 1845.

[19] J. D. Lang, *Cooksland in North-Eastern Australia*, London, 1847, chap. v.

FIG. 3: THE ENVIRONS OF BRISBANE c. 1845.



(Based on the Map by H. Wade dated 1844, in the Survey Office, Brisbane.)

HEIGHT OF LAND	
OVER 200 FT.	EXISTING TRACKS.
100 - 200 FT.	PROJECTED ROADS
50 - 100 FT.	SWAMPS.
UNDER 50 FT.	BOUNDARIES OF BRISBANE (GAZETTED 5th. MAY 1846.)

Ipswich or to bullock-team carts and conveyed thus to South Brisbane, or Cleveland on the shores of Moreton Bay. There were at that time two main ferries across the river at Brisbane, the Russell Street Ferry which approached the south-western end of Queen Street and another at Kangaroo Point which connected with the north-eastern end of Queen Street at Petrie Bight (Fig. 3). The second of these was of lesser importance because of the hilly approach along the Point and the steep north bank of the river at the Bight. Delays occasioned in

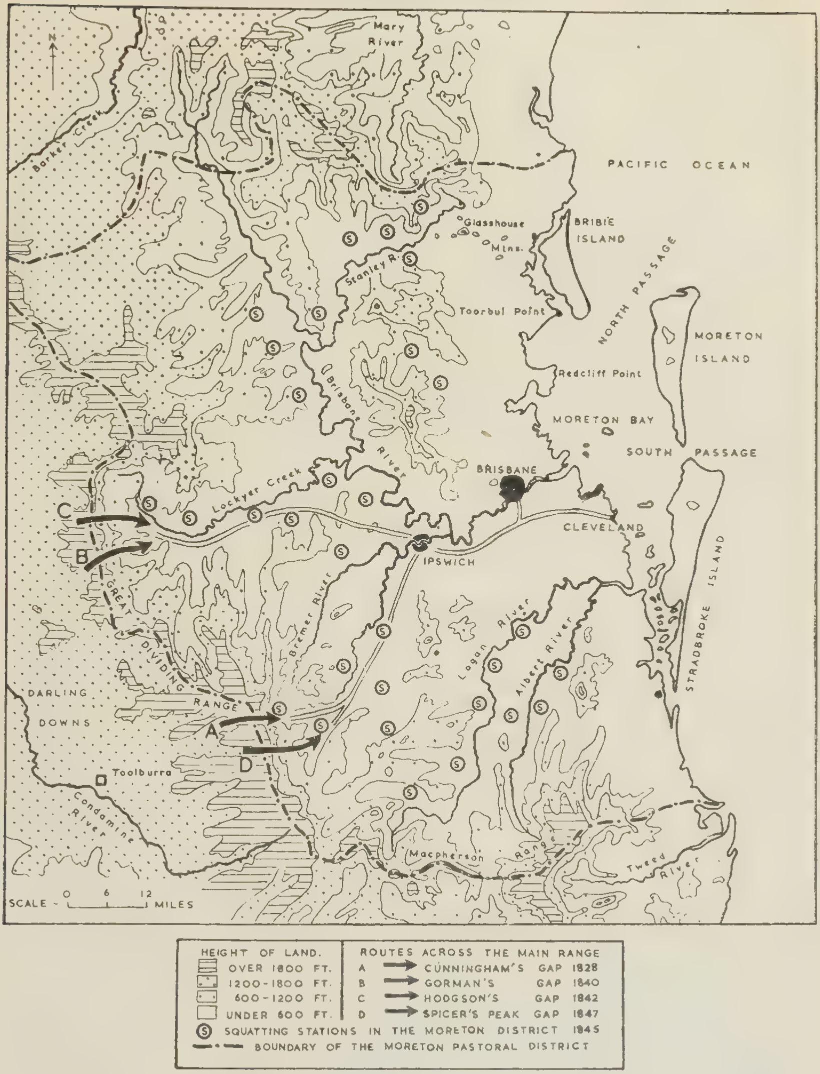
crossing the town from the southern side of the river were so frequent and prolonged that many squatters preferred to continue the haul by road as far as Cleveland on the bay, and ship the wool direct from that port.

During the forties there were thus three termini for the produce of the Darling Downs ; Ipswich at the head of river navigation, on the Bremer river ; Brisbane at the head of ocean navigation on the site of the former gaol ; and Cleveland on the shores of Raby Bay, surveyed in 1850 and named shortly afterwards. Considerable rivalry developed between these three ports, and provides an interesting study in the relative strength of geographical and political influences affecting the rise of pioneer settlements. Ipswich could never have displaced Brisbane entirely as the chief port of trans-shipment for ocean vessels to the degree that Cleveland might have done, for Ipswich was not accessible to large steamers. Nevertheless in 1845 business men in Brisbane were jealous of the town on the Bremer river which had recently set up a barge service between the two towns to convey produce from the interior to Brisbane by water, and it was significant that the shortest routes from the Downs to the shores of Moreton Bay converged on Ipswich before proceeding eastwards through the gap in the coast-ranges (Fig. 4).

In 1842 the Hunter River Steam Navigation Company began a regular service of vessels between Brisbane and Sydney. There was no wharf in Brisbane at that time, and vessels used to tie up alongside a felled tree trunk 6 ft. in diameter which lay parallel to the bank on the south side of the river opposite the town. The trade must have been profitable for three years later the company constructed a wharf and added a second vessel—the *Sovereign*—to the service. In June, 1846, Brisbane was made a port of entry and clearance and a sub-collector of customs was appointed. At this time wool, hides and tallow were almost the sole commodities exported overseas from the Moreton District, and it is noticeable that because of its location appreciably nearer the tropics, Brisbane received no benefit from the profitable trading activities of whalers and sealers which had characterised the growth of other maritime settlements in Australia during the early nineteenth century.

As long as the South Passage remained the chief entrance to Moreton Bay, Cleveland possessed some slight advantage over Brisbane as the port for the region. The direct haul of wool by bullock-cart along the road from Ipswich was little more than the distance from the latter town to Brisbane, and it avoided the delays occasioned by the crossing at South Brisbane and the passage down 14 miles of the lower Brisbane river. Cleveland was more rapidly reached from the South Passage than Brisbane, and above all was championed by the squatters of the Darling Downs, who represented at the time the most prosperous element in the population of the region. Nevertheless the shallow waters around Cleveland Point uncovered wide mudbanks at low tide which prevented all but the smallest vessels from approach-

FIG. 4: THE MORETON DISTRICT c.1845.



ing, even when a wooden jetty had been constructed, and the harbour was exposed to north winds. These deficiencies could no longer be overlooked when the South Passage was abandoned, for the new approach channel favoured Brisbane. In 1847 the *Sovereign* was wrecked and 44 lives were lost whilst trying to negotiate the South Passage bound for Sydney; six years later the *Countess of Derby* was wrecked on entering the same channel. From these and other misfortunes Cleveland scarcely recovered, and the growing preference for the relatively safer North Passage established Brisbane as the chief port for the region.[20]

[20] J. D. Lang seems to have been alone in regarding Toorbul Point, on the mainland overlooking Bribie Island, as the most suitable site for the chief port and capital of the Moreton District, *op. cit.*, chap i.

This struggle for recognition was reflected in the slow increase of population. In 1841 the entire Moreton Bay region contained no more than 200 people out of 130,856 in New South Wales.[21] Five years later, Brisbane had but 829 inhabitants, rather more than half the total for the Moreton District.[22] By 1851 there were 2,543 people settled in the town, many of them immigrants recently arrived under organised colonisation schemes.[23]

The rapid occupation of the Downs in the eighteen forties produced an acute labour shortage on the sheep-stations which the pastoralists attempted to remedy by supporting a succession of projects ; they agitated for a revival of convict transportation, they attempted to obtain Kanakas from Pacific Islands and Chinese from the mainland of Asia ; they even lent support to the colonising efforts of Dr. Lang, although Lang had been one of their bitterest opponents over the question of convict labour.

Transportation of convicts to the mainland of Australia had been abolished in 1840, and attempts by the British Government to revive the system were stoutly resisted in Sydney and Melbourne. But at Moreton Bay "squatterdom ruled the coast also and gratefully accepted any labour it could get."[24] The last convict ship, the *Bangalore*, arrived at Brisbane in 1850. By this time, however, opinion even there was hardening against the revival of transportation. Discontent with the government in Sydney had led to a demand for separation from the parent colony, and the people of Brisbane gradually realised that they would be less likely to gain responsible self-government if they accepted large numbers of convicted criminals into their midst. "Separation" accordingly became the focus of political interest in the Moreton District during the fifties.[25] By 1855 the question was virtually settled except for the delicate problem of defining boundaries.[26] This delayed the creation of the self-governing colony of Queensland until 1859, by which time Brisbane with a population of nearly 6,000 people was beyond doubt the chief town north of the Macpherson Range. Henceforth Brisbane was no longer the most northerly settlement of New South Wales, submissive to orders issuing from Sydney, but the administrative centre for a vast area stretching away westward and northward, which it attempted to dominate despite certain disadvantages of location.

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[21] *N.S.W. Government Gazette*, Sydney, 1841, p. 1134.

[22] J. J. Knight, *In the Early Days*, Brisbane, 1895, chap. ix.

[23] W. Coote, *History of the Colony of Queensland*, Brisbane, 1882, chap. vii.

[24] A. Jose, *Australia, Human and Economic*, London, 1932, chap. iii.

[25] The discovery of gold in New South Wales and Victoria during the 'fifties helped to destroy any lingering hopes of reviving convict transportation to Australia and lured labour away from Queensland, thereby aggravating the squatters' troubles ; this southward migration was, however, arrested a decade later when gold was found at Clermont and Gympie.

[26] *Cambridge History of the British Empire*, vol. vii, "Australia," chap. x, p. 291.

GEOGRAPHICAL ASSOCIATION

Spring Conference, Tenby

The Spring Conference at Tenby was attended by about 100 members, and we were fortunate in that it coincided with a spell of splendid weather that enhanced the delights this beautiful sector of Pembrokeshire offers to the geographer at all times.

In opening the Conference, two lectures (of quite contrasted character, but each a brilliant exposition) were given by Professors Bowen and Linton, the one on general regional and historical aspects, and the other on physical aspects of the Tenby region. We were fortunate in having short and longer excursions to amplify these lectures in the field, led by these two masters in their respective subjects, and by Mr. A. L. Leach, hinself a native of Tenby and an authority on the geology of this coast, and Mr. C. Carter of the geography staff at Aberystwyth, who gave us a stimulating lecture based on his own researches, concerning the Bastide towns of the region, and also conducted an excursion around Tenby itself.

The Conference was indebted to his worship the Mayor of Tenby for a warm welcome to the town, and to another distinguished local resident, Sir Frederick Rees, for a most interesting lecture on the growth of Milford. Appropriately, also, Tenby was made the venue for the Herbertson Memorial Lecture, delivered on this occasion by Professor H. J. Fleure, F.R.S., on " The Later Developments in Herbertson's Thought."

The long excursions took the geomorphologists, under the guidance of Professor Linton, along the cliff-bound coast as far as Dale Fort, while the historical geographers accompanied Professor Bowen in a memorable pilgrimage to St. David's.

It was a matter of real pleasure to all of us that our President, Professor Debenham, was able to preside over the meeting (and none will forget his masterly demonstration of the tango, partnered by Mrs. Fleure (jnr.), during a delightful social gathering that was held at the close of the Conference !).

To Professor Bowen the Association owes a very real debt of gratitude for the very hard work that lay behind the organisation of this most instructive and very happy Conference, held at a centre where not only is there no local branch committee (on whose shoulders the burden normally falls), but one where sheer inaccessibility and remoteness are factors of real and practical significance for the organisers. We place on record also our thanks to Mr. Moss, who acted as local conference secretary.

A.G.

Conference of German Teachers of Geography.

The third meeting of the *Verband Deutschen Schulgeographen* met under the Presidency of Dr. Julius Wagner, at Schwäbisch Hall (Würtemburg) from April 14th–18th, 1952. Four British representatives attended the Conference, which included a programme of lectures, discussions, and field excursions covering some 600 kms. in two days, to the Boden See, and excursions to study the historic towns of Swabia and Franconia, the Jurassic scarpland of the Schwäbisch Alp, etc.

The Conference opened with discussions on the problems of geography teaching in the top forms of secondary schools and in primary schools, and a plea was put forward that school geography should emphasise the human problems of man's environment, and that the scientific approach should be left to the university level, a point of view that may be debated in this country !

We record with interest the adherence of the German organisation to the scheme for the union of Geographical Associations as proposed by the Geographical Association of Great Britain in August, 1951 (see *Geography*, vol. XXXVI, pp. 230–231). Our Association was officially represented by Mr. Tom Brown, from whose report these notes are made.

A.G.

Annual Conference Teas, London.

At the Council meeting held at Tenby, the Hon. Secretary was instructed to remind members that the cost of a tea held during the Annual Conference at the invitation of non-metropolitan branches and members, amounts to £12. Donations from members or branches will be gladly received at Headquarters to defray expenses, as the full cost of the tea has not yet been met.

GIFTS TO HEADQUARTERS.

The Hon. Secretary records with gratitude the receipt of donations to the Geographical Association's appeal for help, as follows :—

(Jan., 1951 to May, 1952) :	£	s.	d.
Prof. H. J. Fleure	12	10	0
,, ,, ,, (covenanted)	0	12	6
Mr. E. C. Thomas (Hong Kong)	5	0	0
Miss F. McKechnie	2	18	0
Late Mr. J. W. Page	2	0	0
Miss G. Freeth	1	0	0
Miss M. R. Greig	1	0	0
Mr. C. H. Saxelby (covenanted)	1	0	0
Mr. B. Matthews	0	12	6
Cambridge Branch	0	10	6
Miss K. Gribble	0	10	0
Mr. T. C. Warrington	0	10	0
Miss E. M. Dawson	0	7	6
Mr. R. C. Puddephatt	0	7	6

To Miss M. S. Johnston we are very much indebted for her annual gift to the Association's Library of a complete volume of the *Geographical Journal* together with bindings. Miss Johnston has sent this valuable present continuously since 1911.

ANNUAL CONFERENCE, 1953

The Annual Conference will be held in London as usual, at the London School of Economics. The provisional dates of the meetings are from December 30th, 1952, to January 2nd, 1953. Details of the programme will be published and circulated with the November issue of *Geography*.

BRANCHES OF THE ASSOCIATION

It is with pleasure that we announce the opening of three new branches, at Cardiff (South Wales (East) Branch), Norwich (Norfolk Branch), and at Shrewsbury (Shrewsbury and District Branch). Members in these localities are urged to give the new branches their support ; enquiries should be addressed respectively to Mr. F. T. Baber, 136, Heath Park Avenue, Heath, Cardiff ; Mr. P. C. Walton, 2, Waterloo Park Avenue, Norwich ; Mr. J. Phillip Dodd, Hampton Loade, Alveley, Bridgnorth, Shropshire.

Efforts are being made to initiate or revive branch activities centred at Brighton, Ramsgate, and Berkhampstead and Southampton and members in these districts are invited to join in the formation of the branches. Enquiries may be sent, at present, to Headquarters. Members in Glasgow and district who are interested in reviving the activities of the Glasgow Branch are asked to inform Headquarters office.

The names of members in any precise locality can now be obtained from Headquarters office. Any members who are willing to endeavour to establish new branches are requested to apply for these.

Branches at Luton, Mid-Northumberland District and Sunderland have temporarily suspended their activities.

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GEOGRAPHY IN THE PRIMARY SCHOOL

The first edition (1949) of this handbook has run out of print. A second edition with revisions will be published during the Autumn term, 1952.

REVIEWS OF BOOKS

WITH very rare exceptions, books reviewed in this journal may be borrowed from the Library by full members or student library members of the Association.

Jewish Communities in the Muslim Areas of the Middle East. S. Landshut (for the American–Jewish Committee and Anglo-Jewish Association). 14 × 21·5 cm. xi + 102 pp. London: The Jewish Chronicle, Ltd. 1950. 2/6.

This short survey by a well-known sociologist describes the origins, history, and recent treatment of the Jewish minorities in certain Middle East Countries :— Afghanistan, Persia, Turkey, the Arab League States, and Libya. Cyprus and the Sudan are not included. Many of these ancient communities have recently moved in whole or in part to Israel, so that the information is already outdated. The historical introduction to the work is most valuable as an illustration of the age and unique character of some of these communities. The general insecurity of all religious minorities in Moslem countries, with the exception of Turkey, is shown to be in part due to the present anti-western feeling in the region. To the geographer, the survey is useful for its statistics, a distribution map, and its description of the part played by the Jews in the social and economic life of the countries. As the literature on this subject is scattered, the bibliography provided is valuable, but more use could have been made of page references to works cited in the bibliography. C.G.S.

Map of Israel. The Jewish Chronicle. Scale: 1 in. to 4½ mls. (1/285,120). Produced under the direction of Alexander Gross. London: Geographer's Map Co., Ltd. 1951. 2/6.

Large-scale maps showing the boundaries of Israel, the enlarged Kingdom of Jordan, and the much-discussed Gaza Strip are still rare. This map, on the somewhat unusual scale of 1/285,120, is most disappointing, and compares badly with the excellent maps published by the Survey of Palestine, and the new Survey of Israel. It suffers from most of the defects of the "flat" political map. There are no contours, few spot heights, roads are not classified, and only the more important permanent streams are marked. It shows the provisional boundaries, the United Nations partition decision, and most inhabited places; but many new villages are omitted, and later boundary rectifications are not shown. All place names appear in a marginal index with a numbered and lettered grid reference, and there are rough street plans of Tel Aviv, Haifa, and Jerusalem. Colour is only used to show political affiliation. As a work of reference for place names it has some value. C.G.S.

The Changing Map of Asia: A Political Geography. Edited by W. G. East and O. H. K. Spate. 14 × 22 cms. x + 414 pp. London: Methuen & Co., Ltd. 1950. 25/-

The importance of Asia in the world to-day is generally recognised but, as the editors state in their preface, its "infinitely serious and complex problems are too often discussed in terms of political personalities and popular movements only, against but a vague and shadowy background of landscapes and resources." They therefore seek "to present the setting of the stage, to give a fuller content to those names of peoples and of places which too often remain mere names in the headlines." This object has been most successfully attained and this book should prove of value, not only to geographers, but also to all who have any political or administrative responsibility for this part of the world.

The editors have themselves written an introductory section, " The Asian Background," and an epilogue, " The Unity of Asia." These form perhaps the most stimulating sections of the whole work as, for example, when the somewhat novel conclusion is reached that, viewing Asia from within outwards, the only real unity within the area, the one common denominator throughout Asiatic Asia, is poverty—especially agrarian poverty.

The five other chapters, written by various authors, deal with the areas called in Fig. 1 " The Asian Realms," namely South-west Asia, India and Pakistan, South-east Asia, the Far East, Soviet Asia, and High Asia. In each case the geographical and historical background is first considered and then various political and geopolitical matters are discussed, treatment and emphasis of the latter naturally varying for the different regions.

This is an important and stimulating work. It is therefore unfortunate that it is not without frequent blemishes of style and syntax. It is also unfortunate, though inevitable, that since the changes implied in the title of this work are continuing all the time, such a book as this begins to become out-of-date almost before it is published. This, however, should not seriously lessen its value, even though it seems somewhat strange in the light of recent events to read (page 47) that " the withdrawal of American forces, in view of the success of Chinese Communism, might threaten an early 'liquidation' of the south Korean administration " and (page 288) " Few boundaries have more explosive possibilities than the 38th parallel." I.S.M.

Regionalism in America. Merrill Jensen (Editor). 16 × 24 cm. xvi + 425 pp. Madison. University of Wisconsin Press. 1951. $6.50.

This book, by about 20 authors, begins with an examination of the scheme often used in early books, of eastern (or northern), middle, and southern states, which, however, became complicated as the republic spread its power westwards. By about 1900 regions on a physiographic basis were being discussed, but groups of states remained important because so many statistics are collected on a state basis. It is said that government has about 108 schemes of regionalisation in use for different purposes, all having grown out of the original scheme of appeal courts. The region, defined by its possession of a fair degree of homogeneity of life in the broad sense, is shown to lend itself to research that is dynamic rather than to merely formal description, but no one scheme of regionalisation is likely to gain general acceptance. The middle of the book gives essays on a number of diverse regions, and that on the essential south will be found fascinating even if it does not quite face up to the colour troubles. The Tennessee Valley Authority gets a valuable chapter to itself. More interesting still are the sections on regionalism in architecture, paintings, literature and speech. The heritages from Europe (portrait painting from Puritan and from Cavalier England as well as, in the Middle Atlantic region, from Holland) are the basis of American painting, later affected by cosmopolitanism from 19th century Paris as well as by local individualism which, in the famous case of Winslow Homer, was far from being provincialism. The half-timber house of Old England with its traditional " fillings " of lath and plaster had to have a clap-board protection in New England to withstand the severe winter, and in this way there evolved the splendid tradition of the New England house set in an avenue of maples reddening to the Fall. Students with some knowledge of U.S.A. will enjoy this book as much as the reviewer has enjoyed it, without necessarily accepting all it has to say.

H.J.F.

Exploration and Discovery. H. J. Wood. 12 × 19 cm. 192 pp. London: Hutchinson's University Library. 1951. 8/6.

In the short space of this book, the author has wisely set himself the task not of writing a continuous history of exploration, but of composing a series of essays on particular events and personalities in the story of geographical discovery. This method suits some subjects, and the chapters on Cook and Humboldt, complete in themselves, read particularly well. Other episodes, however, would benefit from a longer account of their historical context and geographical significance. For example, the importance of Polo's book is not made really clear, and the quite lengthy description of Ibn Battuta's travels leaves no true idea of Arab achievements and shortcomings in the fields of navigation and overland travel. The charts of routes are useful, but the topographical maps

are not detailed enough to replace an atlas, and the space might have been better used with sketches on the style of Fig. 2, of outlines of famous world maps of various periods. On page 20, the reason why Ptolemy drew the known world too large is not made quite clear. It was simply due to the exaggeration of angular distances when converted from linear on an erroneously low estimate of the length of a degree of the meridian. For the rest, all information is full, accurate, and presented in a scholarly fashion ; differing theories are presented succinctly and fairly, and the author is clearly familiar with the latest researches in his subject. The following words are noted as misprinted : positions (p. 19), Paropamisus (p. 22), rhinoceros (p. 24), John de Plano Carpini (p. 33).

W.C.B.

Victoria's Subjects Travelled. An Anthology. Herbert Van Thal (Editor). 14·5 × 22 cm. 384 pp. London. Arthur Barker, Ltd. 1951. 25/–.

This anthology is described by the author as a tribute " to a limited number of the great company of British men and women who travelled and explored between 1850 and 1900." He finds this period " rich in names many of which have been neglected " and is impressed by the part played by women ; of 41 extracts, 12 come from the works of women travellers.

Mr. Van Thal has aimed at variety and has achieved his object with success. Several passages relate to varied aspects of town life—Sir William Butler on Paris, Amelia Edwards on Cairo, Constance Cumming on Canton, Anthony Trollope on Sydney, and Isabella Bishop on Seoul. There are extracts relating to travel in Greece, Italy, Spain and Portugal. By way of contrast we have H. E. Bates on Tucúna Indians in South America, J. Chalmers on the inhabitants of New Guinea and A. R. Wallace on the Dyaks of Borneo. Travel in Asia is well represented, as might be expected—the Americas, islands of the Pacific, and Africa receive slight treatment.

Since the Editor aims at focusing attention on the obscure, it follows that some well-known explorers are omitted, but we have Samuel Baker on " Dead Cities of Ceylon," and Richard Burton and Charles Doughty on Arabian topics, while Francis McClintock provides the only reference to polar travel. Within the limits he has set himself, Mr. Van Thal has produced a very readable book, competently edited, well illustrated. Biographical notes introduce each author.

H.J.W.

The University Atlas. George Goodall and H. C. Darby (Ed.). 27·5 × 38 cm. xvi + 96 + 36 (index) pp. London : George Philip and Son. 1948. 22/6.

That a sixth edition of this well-known atlas has been called for is evidence of its wide usefulness. The particular merit that distinguishes it from other atlases continues to be the attention it gives to the basic distributions of aspects of climate, soil and vegetation that are important in the study of geography. Although one can fully endorse earlier commendations of this atlas there are certain amendments that would enhance its reputation even further. The detail shown on the structural sections on page 2 cannot be directly related to the accompanying structural map of Europe and since considerable geological knowledge is necessary for the understanding of the complex story they contain they could be omitted without loss. On some maps the layer colouring is unsuccessful ; on page 9 the fragments of pale yellow and green are not sufficiently distinct to mark and identify clearly the climatic regions ; the hatching and cross-hatching on the red plates tends to be open and coarse and here a finer ruling would produce a more pleasing gradation of tint and would tend to avoid the heaviness which reduces the legibility of the names on the black plate, e.g., Switzerland on page 46 ; the green used for the 600–1,200 feet zone has in places almost the appearance of a fluorescent prominence, a particularly unpleasing example being found in the map of the North-East United States on page 88. The wealth of place names included in some maps has resulted in a heavy black plate, e.g., South-East England and the Midlands on pages 30 and 31, and Italy on page 54 ; on the other hand the map of West Central Europe on pages 48 and 49 seems to be too open and in fact although on a scale of 1/2 million the detail is not significantly different from that contained in the map of Central Europe (page 46) on half that scale. Despite these criticisms the atlas maintains the solid worth of earlier editions and can be recommended as a most helpful and trustworthy *vade mecum.* N.P.

Principles of Human Geography. Ellsworth Huntingdon. (6th Edition). 15·5 × 23·5 cm. xviii + 805 pp. London: Chapman & Hall, Ltd. 50/–. New York: John Wiley & Sons. 1951. $6.25.

This massive volume, weighing nearly a quarter of a stone, was first published in 1920 and has been repeatedly revised to meet the demands of American college students. The present revision is by Professor Earl B. Shaw. Leaving aside the question of whether it is any easier now than it was 30 years ago to define the principles of human geography, one feels the subject should have been tackled on its own merits. As it is, a good deal of space is devoted to sections on physical geography and there are chapters on regional geography at the end.

The book is frankly American in outlook, but Europe comes a good second—one reads on the first page that " the Scotch are tall, fair-headed, active and inventive "—and Asia a long way behind. The familiar map of civilisation shows that no part of Asia is more than medium in grade: one is left with the suspicion that this is related to the fact displayed on another map that the Asiatics have only one car to 1,250–1,750 people as against the American ratio of one to ten or less. The diligent reader will find much to question but also much to stimulate his interest in this always readable text. It is abundantly illustrated and provided with Questions, Exercises and Problems.

E.E.E.

Geography of Hunger. Josué de Castro. 14 × 22 cm. 288 pp. London: Messrs. Gollancz, Ltd. 1952. 18/–.

This work may be regarded as a counter to the neo-Malthusian pronouncements of William Vogt on the problems of world population and food supply. After analysing the modern medical conception of hunger the author proceeds to examine its world distribution and then points to recent developments in the science of nutrition which lighten an otherwise dark and sordid picture. His optimism springs from the fact that, as a follower of Doubleday, he believes over-population to be an effect and not cause of hunger and that the creation of abundance by eradicating man-made scarcity will lead to a reduction in human fertility. This he supports by medical evidence on the action of oestrogens in the blood stream of under-nourished populations. There is throughout a tendency to neglect the social controls of reproduction and to over-emphasise the influence of colonial land utilisation in hunger creation, but the book is nevertheless a stimulating reminder of the primary task confronting all mankind irrespective of political and racial colour.

W.K.

Insects as Human Food. F. S. Bodenheimer. 20·75 × 15·5 cm. 352 pp. The Hague: W. Junk. 1951. N.P.

Professor Bodenheimer has given us a volume remarkable for the vast array of material collected from a variety of publications to illustrate his somewhat unusual subject. He draws attention to the basic importance of insects as a necessary part of the foods of many societies, from prehistoric to modern times. Many primitive peoples in Africa, Asia and America to-day, especially in tropical regions, live on unbalanced diets or are underfed. This deficiency is often regarded as the main reason for the prevalent low standards of life. Gathering insects helps to supplement serious deficiencies of diet, sometimes at regular seasonal intervals, and sometimes only in times of emergency, as during prolonged droughts. The utilisation of insects is regarded by the author as an instinctive and welcomed response to physiological needs for proteins and animal fats, and not merely as a type of food adopted only as a last resort when all else fails.

He quotes striking evidence of the food value of insects. The considerable dietary significance, for instance, of ants in intertropical Africa, is appreciated when we learn that 100 gr. of fried termite yield 561 calories, apart from their value as a food with a high fat and 36% protein content; these considerations put termites among the richest of foods, approaching ground nuts in dietary value. Locusts (which we tend to think of primarily as a menace to food resources) appear also in some circumstances as a valuable and highly nutritive food resource widely enjoyed and taken in large quantities by many peoples.

The value in such ways of a variety of insect foods is considered with reference to the diets of primitive peoples in Australia, Africa, Asia and the Americas. The book is a reference work for those interested in this subject, and includes no less than 20 pages of bibliography, whilst the 330 pages of text are packed

with information not readily available under one cover elsewhere, thus forming a useful chapter in the study of the ecology of man.

A.Gt.

Fishing in Many Waters. James Hornell. 17·5 × 24·5 cm. xv — 210 pp. Cambridge: Cambridge University Press. 1950. 30/-.

This book, published posthumously, and written for a variety of readers, should have a special interest for teachers of geography as a reference work illustrating the arts and crafts of fishing among primitive and other societies in many parts of the world. It has the additional merit of lavish illustration by beautiful photographs and very clear line drawings. Much information is assembled that is not readily accessible elsewhere, and the collected studies not only make good reading but afford opportunities for considering comparatively techniques associated with fish trapping, baiting, poisoning, diving, and the use in fishing of the bow, crossbow and blowgun, etc. In every case the detailed descriptions are based on the author's personal observations made during expeditions in Negro Africa, India, Ceylon, the Far East and South Seas, amongst other regions visited and described. The result is to give a selected record of human skills, ingenuity and patience in crafts some of whose origins go far back in human history, and in this sense the book makes a useful contribution to the study of material cultures.

A.Gt.

Everything has a History. J. B. S. Haldane. 22 × 14 cm. 292 pp. London: George Allen & Unwin, Ltd. 1951. 16/-.

This volume consists of a collection of over 60 brief scientific essays which have previously appeared in such journals as the *Daily Worker* and *British Ally*. Most of the essays are little more than three pages in length. One longer essay of 18 pages on "Human Evolution" was originally delivered as a lecture at Princeton University. The author states that "the central idea running through the book is that everything has a history, often a very strange one, and that most things have a future, often a very strange one too." This theme is clear enough in the essays on geological subjects which are grouped together in the two earlier parts of the book, but it is not so evident in the essays dealing with weather and astronomy.

It is not surprising, in view of Professor Haldane's main interests, that the zoological essays are the most stimulating and original in the whole collection. The author is able to present the results of complicated scientific research with absolute precision but in clear and non-technical language. Half a dozen short essays on great scientists precede two longer ones under the heading "Controversial." These two essays attack the views of Mr. C. S. Lewis. Professor Haldane, in his preface, foresees that some readers "will regard these articles as in bad taste." It is highly probable that many will do so, but a further objection to these two essays is that they spoil the unity of the book.

The versatility of the author in handling such a diverse range of scientific subjects is amazing, but the frequent introduction of controversial political and economic issues into lucid scientific discussions will be found tiresome by many readers.

E.W.G.

The Teaching of Pre-History in Schools. Historical Association Pamphlet No. 4. Dina Portway Dobson. 14 × 21·5 cm. 22 pp. London: George Philip and Sons. 1951. 1/6.

This Historical Association pamphlet is largely devoted to a summary of British prehistory which, though notably free from jargon, is over-simplified and sometimes misleading. The initial halting progress of peaceable megalith builders from one anchorage to the next can hardly be described as "one invasion from Spain and Portugal and another from Brittany." It could, though, be explained as exploration in the family coracle or dug-out. The pamphlet takes note of loans by Museums Schools Services and advises much handling of specimens. The making of models and pottery is advocated. All this is good civilised prehistory for the good civilised child. The less good might like to be interred with appropriate grave-goods as crouched burials between four desk lids or, as Romans, storm the British-held ramparts of the nearest Iron-Age camp. Energy expended in trees and woodlands could be canalised into prehistoric ways. Playing ape-men is less dangerous than selecting "in a class in a school . . . the main racial types of which the population is

made up." Fresh air, muddy shoes on active feet, a $2\frac{1}{2}$-inch map and a child's imagination are a powerful combination when turned on to the traces of early man in our landscape. But these, of course, are employed in the teaching of prehistory out of school. Should it not be fostered indoors? There is too much stress here on cramming heads with facts and storage cupboards with models, and too few suggestions for field work in a subject in which many children fired by lively teaching in schools, have already made their own open-air studies.

M.D.

Finding Out. The Discovery Books Series. O. Garnett. $15 \cdot 5 \times 20 \cdot 5$ cm. xv + 160 pp. Oxford. Basil Blackwell & Co., Ltd. 1951. 5/3.

This class textbook is uniform in size and format with the first of the series: *Looking and Doing*. It is strongly bound in cloth, uses large clear type and contains 128 excellent half-tone pictures and 36 maps and diagrams. *Finding Out* is intended for use with the second junior school year to bridge the gap between large-scale local maps and maps of the British Isles. This is achieved by using such topics as letters, seaside places, bridges, railways, and the river Thames, which may arise out of local studies and lead further afield. It is thus shown how, by using the children's local and holiday experiences, and by the very careful selection and skilled use of pictures and maps, the children can be helped to "imagine accurately" places they have not seen.

This series forms a most important contribution to the practice of geography teaching. It is not just "another series" of geography texts but the application in textbook form of the principles so clearly and fully treated in the author's *Fundamentals of School Geography*. This latter book, first published in 1934 has had a very great influence in the methods of teaching geography in junior schools and many of its easier applications have become common practice in most schools. Hitherto it has not been easy, even for specialist teachers, to find the right kind of pictorial materials or strike quite the right note in applying these fundamentals. The "Things to Do" at the end of each chapter are an essential part of the book, for it is what the child does which matters most. The book provides a reference volume suited to his age, and takes into account his hunger for detail and his desire to discover and experiment, to collect, to draw and so on. The topics are not restricted to the purely geographical but follow the natural interests of the child. Tool knowledge and vocabulary are being carefully extended throughout. And nothing of this is done in a vague or optimistic way: it is the result of many years of practical trial in many classrooms.

The pictorial illustrations merit especial comment, since every illustration has its carefully designed part to play. The two pictures of Louisa Bay, Broadstairs showing conditions at high and low tide, and the juxtaposition of a picture of the train arrival indicator at Euston with a map of the lines served, are examples of the way in which illustrations are used to provoke really profitable child activity. None of the five pictures of the Forth Bridge could have been omitted without loss; the five together are more than five times as valuable as any one.

E.F.M.

The Homeland: Great Britain and Ireland. The Charter Geographies. R. W. Brooker. $13 \cdot 5 \times 20$ cm. 317 pp. London. G. G. Harrap & Co., Ltd. 1950. 8/6.

Many books dealing with the British Isles have been published recently, but this book is an attempt to break away from the strictly regional approach, partly by grouping regions with common industrial or farming interests together, and partly by general chapters on structure, climate and vegetation. Many teachers have felt the need for such an attitude and, considering the price of this book, may choose to use the book for more than one school year.

The reviewer feels that the book, with its dual approach, attempts too much in its 300 pages, with a consequent loss of detail. The style is very readable and suitable for use by pupils of $13\frac{1}{2}$–$15\frac{1}{2}$ years in the Senior Modern schools. Many illustrations are disappointing; some would be worthy of more study if they were clearer; others occupy space that might more profitably have been given to better-chosen views or an occasional block-diagram.

L.J.C.H.

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AG—Acta Geographica. A of G—Annals of the Association of American Geographers. AJ—Alpine Journal. AUCS—Annales Universitatis Mariae Curie-Sklodowska. BE—Bulletin de la Société Royale de Géographie d'Egypte. BGB—Bulletin de la Société de Géographie de Beograd. CGR—Calcutta Geographical Review. EG—Economic Geography. F—Fennia. GA—Geografiska Annaler. GJ—Geographical Journal. GR—Geographical Review. J of G—Journal of Geography. MO—Marine Observer. N—Nada. NG—New Zealand Geographer. PGA—Proceedings of the Geologists' Association. PRST—Papers and Proceedings of the Royal Society of Tasmania. RGA—Revue de Géographie Alpine. RGI—Revista Geografica Italiana. SAGJ—South African Geographical Journal. SGM—Scottish Geographical Magazine. SR—Sociological Review. T—Terra. TPR—Town Planning Review. UE—United Empire.

(E)—English Summary. (F)—French Summary. *—Map.

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